MANAGEMENT ACCOUNTING AND FINANCE
MFAC6211
WORKBOOK 2023
(First Edition: 2018)

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Using this Guide

This guide has been developed to support your use of the prescribed material for this module. There may be occasions when the prescribed material does not provide sufficient detail regarding a particular idea or principle. In such instances, additional detail may be included in the guide. This guide should not, however, be used as a stand-alone textbook, as the bulk of the information that you will need to engage with will be covered in the prescribed material. You will not pass this module if you only use the module guide to study from.

Various activities and revision questions are included in the learning units of this guide. These are designed to help you to engage with the subject matter as well as to help you prepare for your assessments.

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Introduction

Welcome to this 2nd year module in Management Accounting and Finance (MFAC6211). The following information is useful for your understanding of the course requirements this semester.

To introduce this module, we begin with an introduction to cost terms and behaviour in Learning Units 1 and 2. These learning units are created to provide a sound backdrop to management and cost accounting. Key terms and principles within these Learning Units will be used throughout the course of the semester.

We then move on to study different costing systems, namely Activity Based Costing (Learning Unit 3).

By this point, you will realise that the study of cost accounting, primarily deals with Inventory. Learning Unit 4 covers basic inventory valuation methods which includes the FIFO and Weighted Average methods (which you might remember from high school).

Next we will cover a product costing system, Job Costing in Learning unit 5.

More advanced costing methods are studied in Learning Units 6, 7 and 8 namely Process costing; Joint and by-products costing and Direct and absorption costing. Process Costing and Direct and Absorption costing require an in depth understanding of valuation methods covered in Learning Unit 4.

Budgeting and standard costing are covered in Learning Units 9 and 10. These Learning Units introduce techniques to measure and analyse the performance of an organisation. Standard costing has proven to be one of the more complicated sections for students. The only way to master this section is to practise as many questions as possible, as there are various ways of testing these topics.

The last section of this module focuses on relevant information for short-term decision making, where you will be introduced to relevant costing (Learning Unit 11) and cost-volume-profit analysis. (Learning Unit 12).

The content of this module is considerable, and students find great difficulty in studying towards the exam as all topics are examinable and may be integrated. Tests and ICE tasks during the semester will assist you with keeping up to date with the syllabus and ensure that you are studying the content on a regular basis. This will ease the volume that needs to be studied for the final examination. Completing work at home and tackling homework is essential for passing this module.

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Module Resources	
Prescribed Book for this Module	Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM) ISBN: 978-1-4737-7361-5 (Hardcover)
Recommended Additional Reading	Please note that a number of additional resources and links to resources are provided throughout this module on the Learn platform and in this workbook. You are encouraged to engage with these as they will assist you in mastering the various objectives of this module. They may also be useful resources for completing any assignments. You will not, however, be assessed under examination conditions on any additional or recommended reading material.
Digital and Web Resources	Additional digital resources are also available for this module. Please log onto the Student Portal and follow the links to 'Supplementary Digital Material' to source the following.

Module Purpose

The purpose of this module is to introduce students to the field of management accounting focusing on the analysis of data for decision making purposes. Rather than focusing on financial performance, cost accounting focuses on the performance of the production process. The effectiveness and efficiency of this process affects cost, which in the end determines the selling price.

Module Outcomes

MO1	Demonstrate knowledge and understanding of cost classification, cost behaviour and cost objects.
MO2	Demonstrate a knowledge and understanding of cost management accounting systems and apply cost estimation techniques.
MO3	Understand and apply planning, budgeting and control techniques.
MO4	Analyse financial and other data in order to provide information for decision-making.

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Pacer and Assessment brief Applicable to Module: MFAC6211

Learning Unit 1	**An Introduction to Cost terms and Purposes**	*Text book reference*
Related Outcomes: MO1	LO1:Define the different cost objects LO2:Account for manufacturing overheads LO3:Classify costs in terms of cost behaviour principles	Chapter 1, 2 & 4
Learning Unit 2	**Determination of Cost Behaviour**	*Text book reference*
Related Outcomes: MO1	LO1:Explain the behaviour of costs LO2-5:Estimate costs using different techniques	Chapter 3
Learning Unit 3	**Activity-Based Costing systems**	*Text book reference*
Related Outcomes: MO2	LO1: Describe the differences between activity-based costing (ABC) and the traditional costing method LO2: Identify the environment which is suitable for the implementation of an ABC system LO3: Design an ABC system with a view to costing products LO4: Implement an ABC system with a view to costing products	Chapter 5
Learning Unit 4	**Methods of Inventory Valuation**	*Text book reference*
Related Outcomes: MO2	LO1: Determine the cost of inventories LO2: List the different categories of inventory LO3: Value inventory on the First-in-First-out basis LO4: Value inventory on the Weighted Average basis	Content supplemented from various sources, including IAS2 of the International Financial Reporting Standards
Learning Unit 5	**Theme: Job Costing systems**	*Text book reference*
Related Outcomes: MO2	LO1: Identify a job costing system LO2: Record costs in a job costing system LO3: Calculate the profit or loss per job	Chapter 6

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Learning Unit 6	**Process Costing systems**	*Text book reference*
Related Outcomes: MO2	LO1: Describe the users of a process costing system LO2: Calculate the completed units and the equivalent units for work-in-process (WIP) LO3: Prepare the quantity statement based on the weighted average method of inventory valuation. LO4: Prepare the quantity statement based on the first-in-first-out (FIFO) method of inventory valuation. LO5: Calculate the normal loss for a specific period, depending on the wastage point. LO6: Calculate the abnormal loss for a specific period, depending on the wastage point. LO7: Prepare the production cost statement based on the weighted average method of inventory valuation. LO8: Prepare the production cost statement based on the first-in-first-out (FIFO) method of inventory valuation. LO9: Prepare the allocation statement based on the weighted average method inventory valuation. LO10: Prepare the allocation statement based on the first-in-first-out (FIFO) method of inventory valuation. LO11: Record process costs in the general ledger. LO12: Allocate process costs in the general ledger.	Chapter 9

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Learning Unit 7	**Joint Products and By-Products costing systems**	*Text book reference*
Related Outcomes: MO2	LO1: Differentiate between joint and by-products. LO2: Allocate joint costs, using different methods. LO3: Calculate profits from the sale of joint products. LO4: Calculate the value of joint and by-product inventory. LO5: Account for by-products.	Chapter 8
Learning Unit 8	**Direct and Absorption Costing**	*Text book reference*
Related Outcomes: MO2	LO1: Identify the differences between direct and absorption costing methods LO2: Draft the statement of comprehensive income according to the absorption costing method using different inventory valuation methods LO3: Draft the statement of comprehensive income according to the direct costing method using different inventory valuation methods LO4: Reconcile the differences in profit between the two costing methods LO5: Identify the most appropriate method given specific circumstances	Chapter 7

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Learning Unit 9	**Theme: Budgeting techniques**	*Text book reference*
Related Outcomes: MO3	LO1: Describe the stages in the budgeting process LO2: Describe the sub-budgets included in the master budget LO3: Prepare a cash budget LO4: Prepare a flexible budget LO5: Describe the advantages and disadvantages of budgeting	Chapter 16
Learning Unit 10	**Theme: Standard Costing**	*Text book reference*
Related Outcomes: MO3	LO1,LO4,LO7,LO10,LO13: Calculate selected variances using a standard costing system. LO2,LO5,LO8,LO11,LO14: Calculate the standard cost LO3,LO6,LO9,LO12,LO15: Discuss reasons for variances LO16: Prepare a reconciliation between budgeted and actual profit	Chapter 18

Learning Unit 11	**Relevant Costing**	*Text book reference*
Related Outcomes: MO4	LO1: Identify the characteristics that make information relevant. LO2: Distinguish between relevant and irrelevant information with regards to a specific decision. LO3: Identify the qualitative factors that has an influence on a specific decision taken. LO4: Calculate relevant incremental cash flows in a given scenario. LO5: Identify the preconditions for a special price. LO6: Determine appropriate prices for special orders taking into account relevant information, including opportunity costs. LO7: Calculate contribution per unit of a limiting factor identified in a given scenario. LO8: Determine the optimal allocation of available resources. LO9: Determine the optimal product mix.	Chapter 11
Learning Unit 12	**Cost-Volume-Profit Analysis (Sensitivity Analysis)**	*Text book reference*
Related Outcomes: MO4	LO1: Estimate profits using cost-volume-profit analysis LO2: Use Cost-Volume-Profit analysis to determine the expected effect of decisions and events on variables that affect profit. LO3: Use Cost-Volume-Profit analysis to determine the expected effect of decisions and events on profit. LO4: Determine the sensitivity of profit to changes in selling prices.	Chapter 10

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Assessments

Integrated Curriculum Engagement (ICE)	
Minimum number of ICE activities to complete	4
Weighting towards the final module mark	10%

Formatives	Test 1	Test 2
Weighting	20%	20%
Duration	1 hour	1 hour
Write/Submit after	Session 20	Session 45
Learning Units covered	LU 1 – 5	LU 1 – 9
Resources required	N/A	N/A

Summative	Examination
Weighting	50%
Duration	3 hours
Total marks	180
Open/Closed book	Closed book
Resources required	None
Learning Units covered	All

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Learning Unit 1: An introduction to cost terms and purposes

Learning Objectives:

- Define the different cost objects
- Account for manufacturing overheads
- Classify costs in terms of cost behaviour principles

Material used for this learning unit:

- Chapter 1, 2 and 4 of the prescribed textbook

Prescribed material used for this learning unit:

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

Study chapter 1

Study the following subsections in chapter 2:

- Cost objects
- Direct and indirect costs
- Period and product costs
- Cost behaviour

Study the following subsections in chapter 4:

- Assignment of direct and indirect costs
- Assigning direct costs to cost objects
- Budgeted overhead rates
- Under- and over-recovery of overheads

My notes

Introduction

This is an introductory learning unit that will prepare you for the rest of this module. Organisations deal with different types of costs. To be able to deal effectively with costs, you need to understand different cost terms, cost objects and the ways in which costs can be classified. This is necessary to communicate useful information to decision makers.

Direct costs and indirect costs

Operating costs in a manufacturing company consist of manufacturing costs, which are also called product costs, and non-manufacturing costs, which are also called period costs.

Manufacturing costs (product costs) consist of:

- Direct material (direct cost);
- Direct labour (direct cost);
- Other direct expenses (direct cost); and
- Manufacturing overheads (indirect cost).

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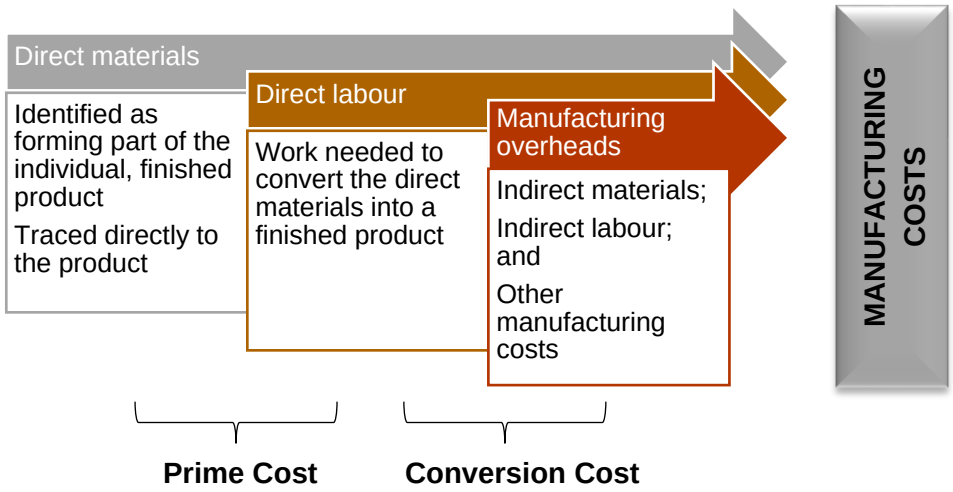
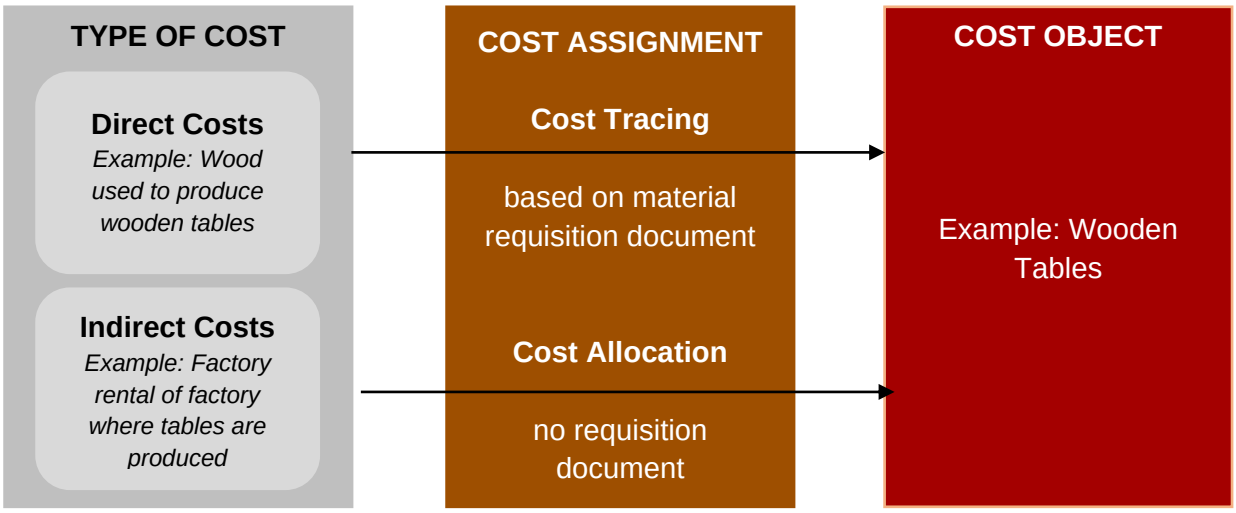


Manufacturing overheads includes indirect material (for example cleaning chemicals, disposable tools), indirect labour (for example the salary of a production supervisor) and other manufacturing costs (for example factory rental). Cleaning chemicals relating to head office and head office salaries would form part of non-manufacturing costs as this is not part of manufacturing.

Prime costs as indicated in the figure above are made up of direct material and direct labour. Conversion costs are made up of direct labour and manufacturing overheads since these are the costs incurred to convert the product from direct material into finished goods.

Non-manufacturing costs (period costs) include all other costs not classified as manufacturing costs, for example cleaning materials and salaries as explained above.

The following diagram illustrates the difference between different types of costs, the assignment thereof and how that then results in a cost object:



Direct materials

The cost of direct materials can be traced directly to a product. Direct materials form part of the physical product and can be measured by the quantity consumed by each individual product.

Direct labour

Direct labour is the labour that can be specifically associated with the product or service, for example the labour hours to manufacture a table. Therefore, the cost can be traced directly to the product.

Indirect costs (Manufacturing overheads)

These costs cannot be traced directly to products or services and therefore you need to find an allocation basis to allocate these costs to the products. Why do you do this? Because these costs are still manufacturing costs and should form part of the cost of the product. Even though you cannot trace them directly to the product you still need to find a way to allocate a cost for “manufacturing overheads” to the product to cost the product accurately to be able to set a selling price. Allocating indirect manufacturing overheads to products are also required by IAS 2. You will learn more about this in your financial accounting syllabus.

There are mainly two methods for determining the manufacturing overhead cost per product: the traditional costing method and the Activity-based costing method. Activity-based costing will be dealt with in detail in Learning Unit 3.

With the traditional costing method, the overhead cost per product is determined by calculating a budgeted overhead rate. This is also called the recovery rate or absorption rate or allocation rate. The following formula may be used:

$$Budgeted\ overhead\ rate = \frac{Total\ budgeted\ overhead}{Total\ budgeted\ activity}$$

You will then use the budgeted overhead rate and include that as your cost for manufacturing overheads per product during the year. The total budgeted overhead includes the total manufacturing overhead costs estimated to be incurred for the year. The total budgeted activity level can be production units, labour hours, materials used, machine hours, etc. Each company needs to decide which activity level would be most appropriate when assigning overheads.

Now, why do we use budgeted figures and not actual figures? Actual figures only become available at the end of the year, but selling prices need to be determined during the year based on the cost of the product. Therefore, you need to calculate the rate at the beginning

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of the year to have an estimated cost for overheads as a part of the product cost. For direct material and direct labour, it is straightforward, because you have the actual cost per unit as you manufacture as these are directly traceable to the product. Product cost will be made up of:

- Direct material (actual cost)
- Direct labour (actual cost)
- Other direct cost (actual cost)
- Indirect cost (manufacturing overheads) (budgeted cost)

Now how does it work? In cost of sales in the statement of comprehensive income you will have the cost of the product multiplied by each actual unit manufactured. Therefore, all costs will be actual costs incurred, except for overheads. Overhead costs are calculated as budgeted cost per unit multiplied by actual units manufactured, this is called recovered overheads. It may also be called applied overheads or absorbed overheads or allocated overheads. In the end, you still need to end up with actual figures in the statement of comprehensive income and therefore need to make an adjustment in the statement of comprehensive income for the difference between the recovered overheads and the actual overheads. This adjustment is called under- or over recovered overheads.

If you have recovered more overheads in cost of sales than your actual overhead cost, this means that you have recovered “too much” overheads during the year, i.e. your budgeted rate was too high. Therefore, due to the higher than actual overheads included in your cost of sales, you now must reduce your expenses. If you have recovered “less” overheads in cost of sales than your actual overhead cost incurred, overheads were under recovered. This means that you must increase your expenses to reach the actual overhead costs incurred.

Activity 1.1

The budgeted and actual data for ABC Limited for the year ended 28 February 20X1 were as follows:

	Budgeted	**Actual**
Manufacturing overheads	1 200 000	1 300 000
Direct labour hours	100 000	110 000
Units produced	50 000	55 000

The appropriate predetermined overhead rate is based on budgeted labour hours.

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REQUIRED

a) Calculate the under or over recovered manufacturing overhead.
b) Prepare the T-account for the manufacturing overhead account.
c) Make a journal entry for the under or over recovery for the year.

Cost-behaviour

Variable costs

Variable costs remain constant per unit. Therefore, as you produce more, your total costs will increase and if you produce less, your total costs will decrease. Examples of variable costs are direct material and direct labour. For example:

Number of tables produced: (A)	Variable cost per material: wood (B)	Total variable cost of wood (A x B)
1	R 120	R 120
1 000	R 120	R 120 000
5 000	R 120	R 600 000

Fixed Costs

Fixed costs remain constant in total and therefore as you produce more the cost per unit absorbed will decrease and as you produce less the cost per unit absorbed will increase. This would mainly be manufacturing overheads, for example factory rental:

Annual total factory rental: (A)	Number of tables produced (B)	Factory rental cost per unit (A / B)
R 1 000 000	10 000	R 100
R 1 000 000	20 000	R 50
R 1 000 000	100 000	R 10

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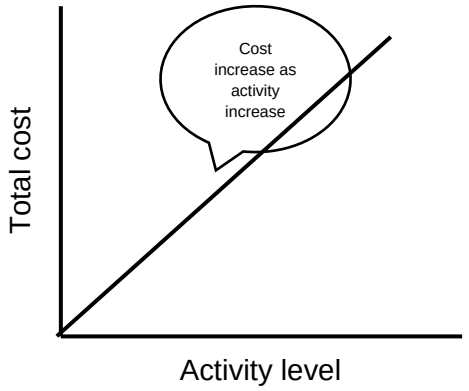
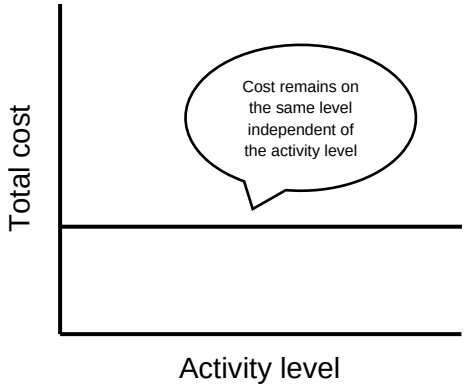
Fixed and variable cost behaviour can be presented in the following graphs:

Variable cost behaviour:

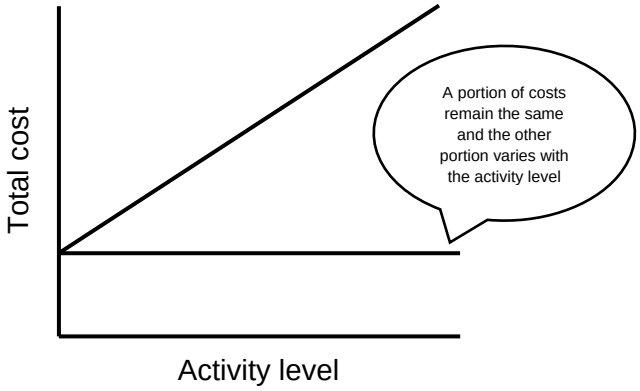


Fixed cost behaviour:



Semi-variable Costs

Semi-variable costs (also called mixed costs) includes both a variable and a fixed element, meaning included in the total cost is both variable costs and fixed costs. Therefore, there will be an amount that remains constant regardless of number of units produced and an amount that varies with the number of units produces. In learning unit 2 we will learn how to distinguish between the two elements. Semi-variable cost can be presented in the following graph:



Relevant range

This is the production capacity (number of units) within which the organisation normally operates. For example, the company's production capacity is 50 000 units. They normally operate within 40 000 units and 45 000 units. Therefore, their relevant range would be between 40 000 units and 45 000 units.

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Learning Unit 2: Determination of cost behaviour

Learning Objectives:	**My notes**
• Explain the behaviour of costs • Estimate costs using different techniques	
Material used for this learning unit: • Chapter 3 of the prescribed textbook	
Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM) **Study the following subsections in chapter 3:** ○ General principles applying to estimating cost functions ○ Cost estimation methods ▪ Graphical or scattergraph method ▪ High-low method ▪ The least-squares method	

Introduction

In this learning unit we will look at different methods to identify the components of semi-variable costs. You were introduced to this type of cost in the previous learning unit. The linear cost equation will be used to forecast and project costs. The following methods are available to identify these components:

- High-low method
- Regression analysis method
- Scattergraph method

You will also learn how to perform cost-volume-profit (CVP) analysis. CVP analysis assists in proper planning and forecasting of profits.

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Linear cost equation

The linear cost equation can be used to forecast and project costs using the following formula:

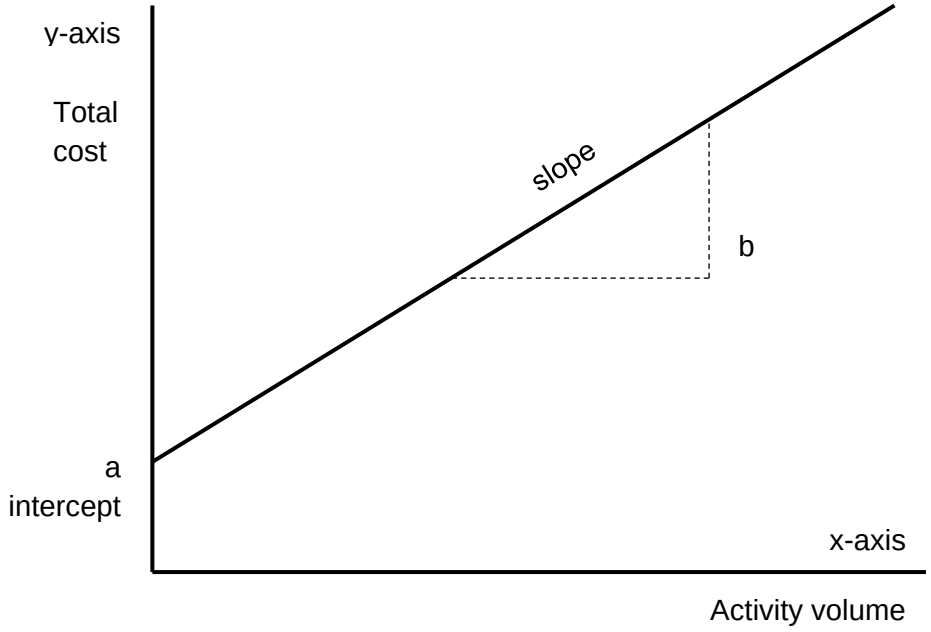
$y = a + bx$

Where:

y = total cost (the dependant variable)
a = total fixed costs (the intercept on the y-axis)
b = variable cost per unit of activity (the slope of the straight line)
x = activity level (normally units produced)

A graphical representation of the linear equation is as follows:

Total cost graph



High-low method

With this method you simply select the highest and lowest observed values within the relevant range and divide the difference in cost by the difference in activity level. By doing this, you obtain the variable "b" in the linear cost equation, which is the variable cost per unit. The formula for this method is as follows:

$$Variable\ cost\ per\ unit = \frac{the\ difference\ between\ costs\ at\ the\ highest\ and\ lowest\ activity}{the\ difference\ between\ highest\ and\ lowest\ activity}$$

Activity 2.1

ABC Limited incurred the costs as indicated below. During the six months ended June, these costs change, but not in direct relation to the volume.

Month	Number of units produced	Historical cost (R)
January	105	12 500
February	135	14 050
March	120	13 800
April	110	12 900
May	95	12 850
June	125	13 950

REQUIRED

a) Use the high-low method to determine the variable cost per unit and the fixed cost in total.
b) Formulate a linear equation that explains and predicts cost behaviour.
c) Forecast the total costs if an estimated 140 units are to be manufactured in July.

Regression analysis method

This method (also called the least squares method) is a statistical method used to determine the relationship between the dependent (total cost) and independent (number of units produced) variables. The following formulas may be used to solve for "a" (the total fixed costs) and "b" (the variable cost per unit):

$$a = \frac{\sum y}{n} - \frac{b\sum x}{n}$$

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$$

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Activity 2.2

Observation (data point)	Volume (units, hours, etc.)	Total overhead costs (R)
1	2 400	19 800
2	3 600	24 500
3	2 700	21 200
4	3 200	23 000
5	3 800	26 600
6	2 300	18 000

REQUIRED

Use the simple regression analysis method to determine the variable overhead cost per unit and the total fixed overhead costs and define a linear equation for the cost behaviour.

Scattergraph method

With this method you plot the total costs for each activity level on a graph. Total costs will be represented on the y-axis and the total activity level will be presented on the x-axis. A straight line is drawn as accurately as possible in between the scattered plotted points on the graph. The point where the line meets the y-axis represent the fixed costs whilst the area above that represents variable costs. The more observations you have, the more accurate your results will be. Refer to Example 24.2 in the textbook Drury 11th edition.

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Revision Exercises

Revision Exercise 2.1

The following information was obtained from the books of Mabudhsa Manufacturers for the six months ended June 20x1:

Months	Units manufactured	Semi-variable manufacturing overheads
July	1 560	53 560
August	1 780	56 420
September	1 350	51 200
October	1 460	51 980
November	1 520	52 500
December	1 630	54 560

The company's relevant range is to manufacture between 1 300 and 1 650 units per month.

REQUIRED

a) Use the high-low method to determine the total costs to be expected in January if 1 820 units are manufactured.
b) Use the least squares method to calculate the variable cost per unit and fixed costs in total for the financial year. Round your answers to two decimal places.

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Learning Unit 3: Activity-Based costing systems	
Learning Objectives: • Describe the differences between activity-based costing (ABC) and the traditional costing method • Identify the environment which is suitable for the implementation of an ABC system • Design an ABC system with a view to costing products • Implement an ABC system with a view to costing products	**My notes**
Material used for this learning unit: • Chapter 5 of the prescribed textbook	
Prescribed material used for this learning unit: Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM) **Study the following subsections in chapter 5:** ○ Types of cost system ○ A comparison of traditional and ABC systems ○ Volume-based and non volume-based cost drivers ○ Designing ABC systems ○ Activity hierarchies ○ Cost versus benefits considerations	

Introduction

Indirect manufacturing costs (manufacturing overheads) are not as easy to identify and measure as direct manufacturing costs. When a company has more than one product it can become difficult to assign indirect costs to products. Traditionally this was done by using the traditional costing system where the total manufacturing overheads were assigned to products using only one cost driver. In the 1980's firms started to implement ABC systems where manufacturing overheads were now subdivided into activities of overhead costs within the total figure and assigned to products by using different cost drivers which are more applicable to the specific overhead type.

In this learning unit, we will look at the difference between the activity-based costing (ABC) and traditional costing method. We will identify the environment which is suitable for the implementation of an ABC system as well as design the ABC system with a view to costing products. Lastly, we will look at how to implement an ABC system.

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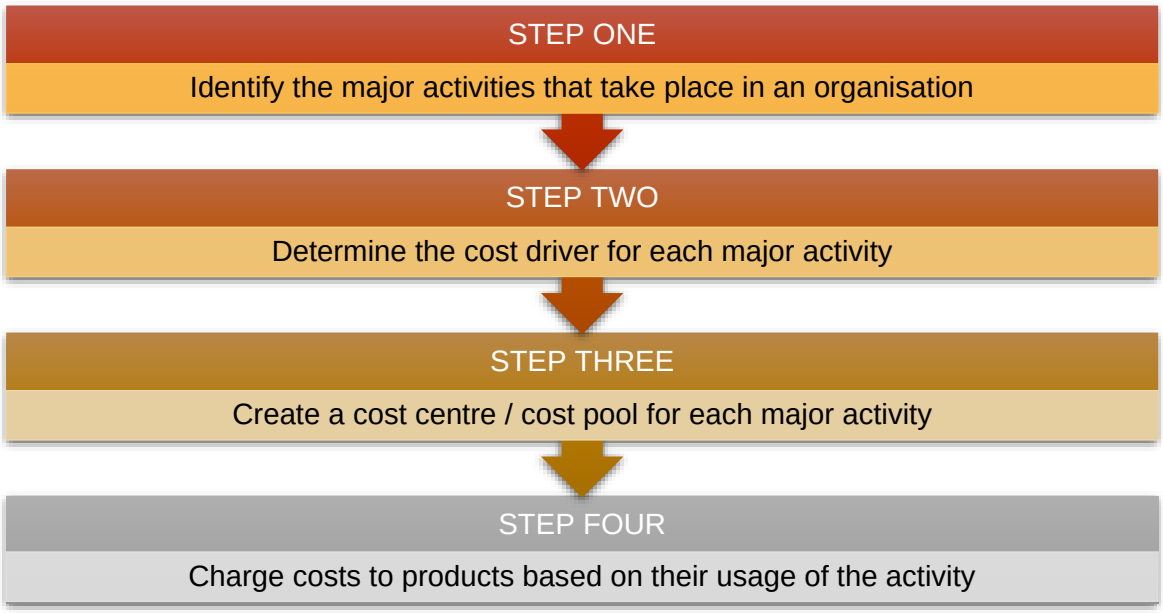
Designing an ABC system

There are four steps involved in designing an ABC system:


STEP ONE
Identify the major activities that take place in an organisation
STEP TWO
Determine the cost driver for each major activity
STEP THREE
Create a cost centre / cost pool for each major activity
STEP FOUR
Charge costs to products based on their usage of the activity

Traditional costing versus ABC

The following example will be used to illustrate the difference between the two costing systems:

Overhead costs	
Quality control	R 120 000
Packaging and shipping	R 60 000
Production set-up	R 70 000
Total cost	**R 250 000**

These are your different costs of activities within the total O/H cost

Activities/Cost Drivers	**Product A**	**Product B**
Inspections	50	30
Machine set-ups	20	40
Number of units manufactured	50 000	30 000
Labour hours	30 000	20 000

These are your cost drivers

Currently overheads are allocated to products based on **labour hours**.

This information is given for the traditional method

REQUIRED

a) Calculate the cost per unit for each product using the traditional costing system
b) Calculate the cost per unit for each product using ABC principles

[Round your answer to two decimal places]

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a) TRADITIONAL COSTING

Total overhead	250 000
Total number of labour hours	50 000
Overhead allocation rate per hour	**R 5**
Allocated to Product A **(R5 x 30 000 hours)**	R 150 000
Allocated to Product B **(R5 x 20 000 hours)**	R 100 000
Cost per unit for Product A *(R150 000 / **50 000**)*	R 3
Cost per unit for Product B *(R100 000 / **30 000**)*	R 3.33

This is the rate per HOUR and NOT per unit

Total quantity of what is "happening" (activity level)

Activity per product x Cost driver rate, i.e. 50 X R1 500 = R75 000

b) ABC COSTING – MUCH MORE DETAILED

Activity	Cost Driver	Total Activity Cost (A)	Cost driver quantities (B)	Cost driver rate (A/B)	Product A	Product B
Quality control	Inspections	R 120 000	80	R 1 500	R 75 000	R 45 000
Packaging and shipping	Units manufactured	R 60 000	80 000	R 0.75	R 37 500	R 22 500
Production set-up	Machine set-ups	R 70 000	60	R 1 167	R 23 340	R 46 680
Total overhead allocated		**R 250 000**			**R 135 840**	**R 114 180**
				Number of units	**50 000**	**30 000**
				Cost per unit	**R 2.72**	**R 3.81**

The different types of costs

The reason for there being a cost

Calculations:

50 x R 1 500	*R 75 000*	
30 x R 1 500		*R 45 000*
50 000 x R 0.75	*R 37 500*	
30 000 x R 0.75		*R 22 500*
20 x R 1 167	*R 23 340*	
40 x R 1 167		*R 46 680*

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Activities

Activity 3.1

Solve review problem IM11.4 in the Drury textbook 11th edition.

Activity 3.2

Solve review problem IM11.5 in the Drury textbook 11th edition.

Revision Exercises

Revision Exercise 3.1

You are the management accountant at Man It (Pty) Ltd, a manufacturing company. You attended a management accounting seminar on activity-based costing and after the training you are confident to assist Man It with activity-based costing.

Details of four products manufactured by the company are listed below:

Products	**F1**	**G1**	**S1**	**S2**
Output in units	3 000	2 500	2 700	2 000
Machine hours (per unit)	2	5	2.5	1

Production overhead for the period is as follows:

Machine department costs	R 60 000
Set-up costs	R 80 000
Stores receiving	R 30 000
Quality control	R 50 000
Material handling and dispatch	R 40 000

Cost drivers to be used for ABC are listed for the overhead cost shown:

Cost	**Cost driver**	**Cost driver volume**
Machine department costs	Machine hours	?
Set-up costs	Number of production runs	32
Stores receiving	Requisitions raised	50
Quality control	Number of inspections	40
Material handling and dispatch	Orders executed	80

REQUIRED

a) Calculate the manufacturing overhead cost per unit for product S1 if all production overheads are allocated on a machine hour basis instead of using ABC.
b) Calculate an activity rate for each of the five activities assuming ABC is now used.

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Revision Exercise 3.2

Alpha Ltd produces two products: A and B. The enterprise produces both products with the same equipment. Product A is a high-volume product while product B is produced in low volumes.

Details of the costing activities, inputs and output are as follows:

Overhead cost	**R**
Material handling	150 000
Material procurement	50 000
Set-up	150 000
Quality control	250 000
Production	600 000
Total	**1 200 000**

Cost driver analysis

Overhead	Cost driver	Product A	Product B	Total
Material handling	Material movements	100	50	150
Material procurement	No. orders	200	100	300
Set-up	No. set ups	60	40	100
Quality control	No. inspections	150	100	250
Production	Direct labour hours	40 000	10 000	50 000
Annual output		80 000 units	20 000 units	

REQUIRED

a) Calculate the overhead cost per product using an ABC system.

[Round off to two decimal places.]

Revision Exercise 3.3

Cycle Co (Pty) Ltd manufactures two products: Cycle-Pro and Cycle-Basic. The target market for these products is flooded with similar products and, therefore, competitiveness and efficiency must be assured in the manufacturing process. The company requires highly specialised machines and the processing is time-intensive. The management of Cycle Co (Pty) Ltd has the desire to implement activity-based costing (ABC) to improve the costing accuracy of the products Cycle-Pro and Cycle-Basic.

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A management accountant report contains the following information:

Total overheads R250 000

Total machine hours 50 000 (used for blanket rate)

	Products	
	Cycle-Pro	**Cycle-Basic**
Units manufactured	12 000	13 000
Direct material cost per unit	R 100	R 60
Direct labour cost per unit	R 60	R 40
Machine hours per unit	2.5	1.5

A time-event study indicated that overhead costs are incurred as follows:

Set-up costs 35%
Inspections 45%
Materials handling 20%

Activities in the consumption of resources were as follows:

	Products	
	Cycle-Pro	**Cycle-Basic**
Set-up activities	125	50
Inspections	180	70
Goods movements	200	300

REQUIRED

a) Calculate the cost per unit for Cycle-Pro and Cycle-Basic under traditional costing.
b) Calculate the cost per unit for Cycle-Pro and Cycle-Basic under activity-based costing.

[Round your answer to two decimal places.]

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Revision Exercise 3.4

Tech (Pty) Ltd specializes in the manufacturing of hard drives (HD), USB's and memory cards (MC). Budgeted information for the 20X1 financial year is as follows:

Products	**HD**	**USB**	**MC**	**Total**
Revenue	4,850,000	2,680,000	1,870,000	9,400,000
Direct material	1,358,000	786,000	689,000	2,833,000
Direct labour	867,000	353,000	285,000	1,505,000
Fixed manufacturing overheads	1,940,000	1,072,000	748,000	3,760,000
Gross profit	**685,000**	**469,000**	**148,000**	**1,302,000**

Fixed production overheads are currently absorbed based on a percentage of revenue. Tech (Pty) Ltd is currently considering changing to an activity-based-costing (ABC) system. The main activities and their associated cost drivers and overhead costs have been identified as follows:

Activity	**Cost driver**	**Production overhead costs (R)**
Manufacturing scheduling	Number of orders	376,000
Parts handling	Number of parts	752,000
Assembly	Assembly time	564,000
Software installation and testing	Number of software applications	1,316,000
Packaging	Number of units	752,000
Total		**3,760,000**

Further details have also been ascertained as follows:

	HD	**USB**	**MC**
Budgeted production units	5,000	20,000	6,000
Average number of units per order	10	50	30
Number of parts per unit	35	20	15
Assembly time per unit (minutes)	30	20	15
Number of software applications per unit	3	2	1

REQUIRED:

a) Calculate the total gross profit for each product using the ABC system.

Drury Adapted

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Revision Exercise 3.5

CC (Pty) Ltd manufactures three types of motorbikes: 50CC, 100CC and 250CC. Historically, the company has allocated all manufacturing overhead costs using total direct labour hours and is now considering introducing activity-based-costing (ABC). The accountant has produced the following analysis.

	50CC	**100CC**	**250CC**
Annual output units	1,200	800	1,000
Annual direct labour hours	130,000	96,000	74,000
Selling price per unit (Rand)	35,000	50,000	75,000
Raw material cost per unit (Rand)	4,000	6,000	8,000

The three cost drivers that generates overheads are:
Deliveries to retailers: the number of deliveries of motorcycles to retail showrooms.
Set-ups: the number of times the assembly line process is re-set to accommodate production run of a different type of motorcycle.
Purchase orders: the number of purchase orders.
The annual cost driver volumes relating to each activity and for each type of motorcycle are as follows:

	50CC	**100CC**	**250CC**
Number of deliveries to retailers	120	60	80
Number of set-ups	40	35	45
Number of purchase orders	200	150	250

Annual costs relating to these activities are as follows:

Activity	**Rand**
Deliveries to retailers	2,100,000
Set-up costs	4,500,000
Purchase orders	2,400,000

Direct labour is paid at a cost of R60 per hour. The company holds no stock.

REQUIRED:

a) Calculate the profit on each of CC's three product types using each of the following methods to allocate overheads:
   1. Traditional method
   2. ABC method

Drury Adapted

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Learning Unit 4: Methods of inventory valuation	
Learning Objectives: • Determine the cost of inventories • List the different categories of inventory • Value inventory on the First-in-First-out basis • Value inventory on the Weighted Average basis	**My notes**
Material used for this learning unit: • Content supplemented from various sources • IAS2 of the International Financial Reporting Standards	
Prescribed material used for this learning unit: • Content supplemented from various sources, including IAS2 of the International Financial Reporting Standards	

Introduction

In this Learning unit we will look at different types of inventories and how to apply different methods of inventory valuation. We will focus mainly on the First-in-first-out (FIFO) and the weighted average method of inventory valuation.

When inventory is issued to production, we are issuing raw materials to the production process for conversion into finished goods. The cost of this issue is not always simple to determine, since inventory of the same type may be purchased at different prices during the same period. It is because of this reason that the above methods were developed for the valuation of inventory.

Cost of inventories

The cost of inventory includes:

- Purchase price
- Import duties and other taxes not subsequently recoverable by the company
- Transport
- Handling
- Any other costs directly attributable to the acquisition of finished goods

Trade discounts, rebates and other similar items will be deducted from the cost of the inventory.

In the case of a manufacturing company, conversion costs (direct labour and manufacturing overheads) are included as part of the cost of inventory of finished goods.

Any other costs incurred in bringing inventory to their present location and condition will also be included in the cost of inventory.

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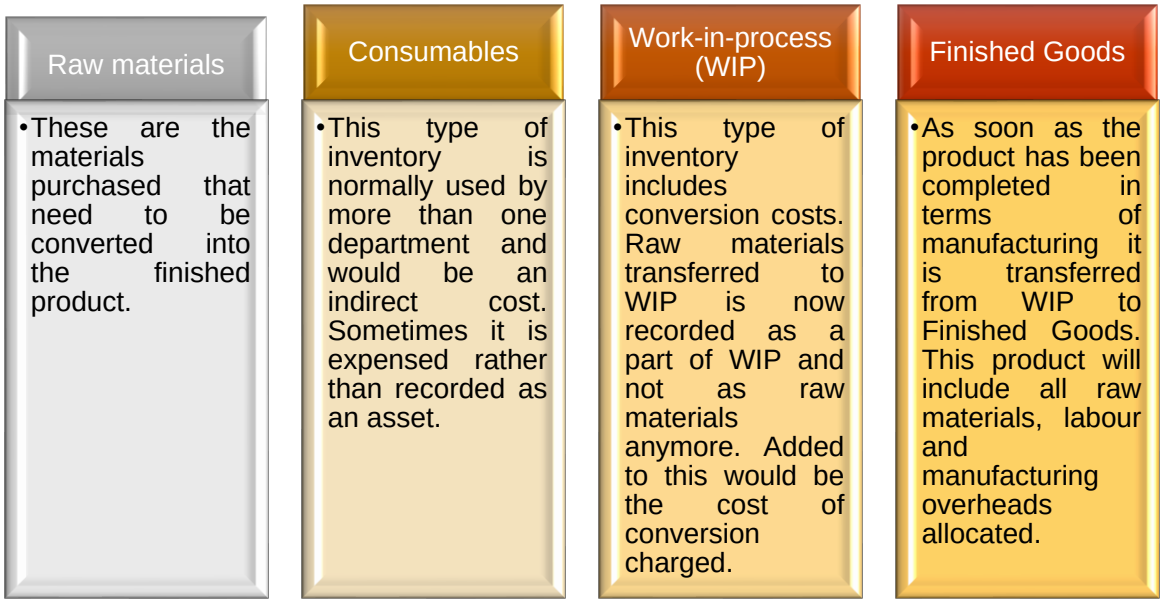
Inventory must be measured at the lower of cost and net realisable value.

A manufacturing company will have different types of inventory, which include the following four categories:


Raw materials
•These are the materials purchased that need to be converted into the finished product.
Consumables
•This type of inventory is normally used by more than one department and would be an indirect cost. Sometimes it is expensed rather than recorded as an asset.
Work-in-process (WIP)
•This type of inventory includes conversion costs. Raw materials transferred to WIP is now recorded as a part of WIP and not as raw materials anymore. Added to this would be the cost of conversion charged.
Finished Goods
•As soon as the product has been completed in terms of manufacturing it is transferred from WIP to Finished Goods. This product will include all raw materials, labour and manufacturing overheads allocated.

The FIFO method of inventory valuation

The FIFO (First-in-first-out) method assumes that inventory items purchased or produced first, are sold first. Therefore, the inventory at the end of the period will be valued at the latest purchase or production price.

The weighted average method of inventory valuation

With the weighted average method, the weighted average cost of items purchased or produced at the beginning of the period (the opening balance) and cost of items purchased or produced during the period is determined. The average price per unit will be recalculated every time a new purchase is made, or goods are transferred to finished goods, or when goods are returned to the supplier. However, whenever goods are issued to production or returned to the warehouse this will not affect the weighted average price per unit.

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Activity 4.1

The warehouse clerk of INV Limited presents you with the following information on material NRV007:

Date		Transaction details
August		
1	Opening inventory	150 units at R 120 each
5	Purchased	160 units at R 135 each
11	Issued	180 units to production
15	Purchased	200 units at R 140 each
	Freight charges of R 3 000 were paid for this order	
21	Returned	50 units purchased on 5 August to the supplier
26	Issued	100 units to production
31	Returned	40 excess units from factory to stores

REQUIRED

a) Calculate the value of inventory on 31 August using the FIFO method of inventory valuation.
b) Calculate the value of inventory on 31 August using the weighted average method of inventory valuation.

Revision Exercises

Revision Exercise 4.1

The warehouse clerk of BestEd Limited presents you with the following information on material Sta152:

Date		Transaction details
March		
1	Opening inventory	250 units at R 2.30 each
4	Purchased	1 200 units at R 2.40 each
9	Issued	800 units to production
12	Purchased	600 units at R 2.50 each
	Freight charges of R 300 were paid for this order	
19	Returned	100 excess units from factory to stores
24	Issued	1 000 units to production
31	Returned	100 units purchased on 12 March to the supplier

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REQUIRED

a) Calculate the value of inventory on 31 March using the FIFO method of inventory valuation.
b) Calculate the value of inventory on 31 March using the weighted average method of inventory valuation.

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Learning Unit 5: Job costing systems

Learning Objectives:

- Identify a job costing system
- Record costs in a job costing system
- Calculate the profit or loss per job

Material used for this learning unit:

- Chapter 6 of the prescribed textbook

Prescribed material used for this learning unit:

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

Study the following subsections in chapter 6:

- Recording the purchase of raw materials
- Recording the issue of raw materials
- Accounting procedure for labour costs
- Accounting procedure for manufacturing overheads
- Non-manufacturing overheads
- Accounting procedures for jobs completed and jobs sold
- Costing profit and loss account

My notes

Introduction

A job costing system is an example of a product costing system. A product costing system deals with the accumulation, processing and recording of costs. A job costing system is suitable to organisations that manufacture unique products according to their client's specifications. These 'jobs" are specialised and can sometimes be "once off". A job costing system calculates the cost of the product/job by identifying the direct material, direct labour and manufacturing overheads used by each job. By doing this, you can set a selling price.

In this learning unit, we will look at how job costing is identified as well as recorded. We will conclude by calculating the profit or loss per job.

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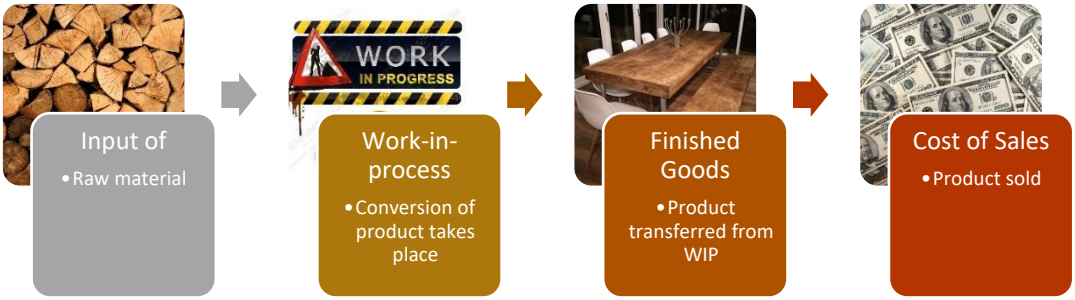
Manufacturing cost flow through ledger accounts



With a job costing system, both sub-ledgers and the general ledger are used. A separate sub-ledger account is created for each job. This is reconciled into the work-in-process account.

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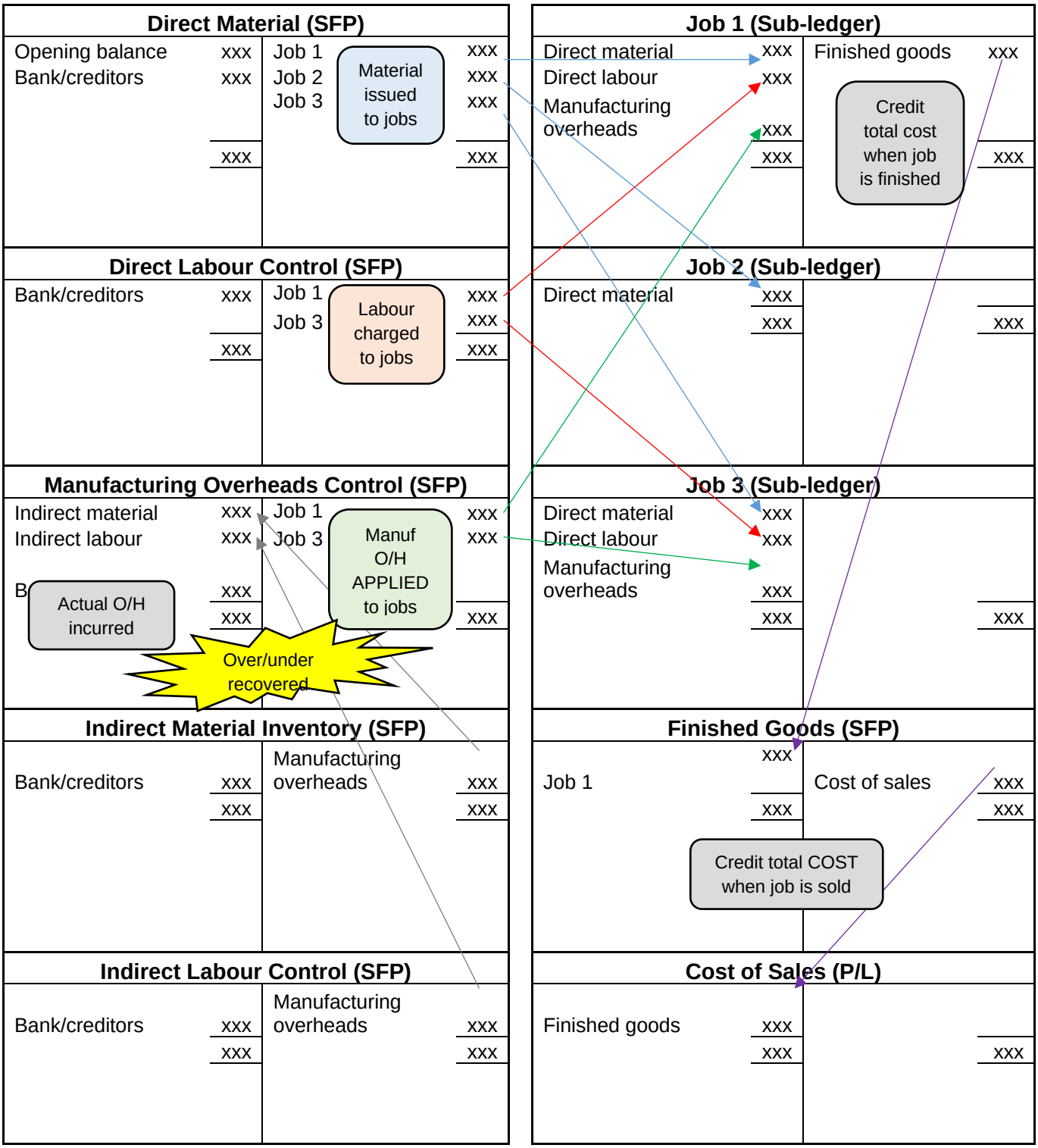
Direct Material (SFP)
Opening balance xxx
Bank/creditors xxx
xxx
Job 1 xxx
Job 2 xxx
Job 3 xxx
xxx
Material issued to jobs
Direct Labour Control (SFP)
Bank/creditors xxx
xxx
Job 1 xxx
Job 3 xxx
xxx
Labour charged to jobs
Manufacturing Overheads Control (SFP)
Indirect material xxx
Indirect labour xxx
B
xxx
xxx
Job 1 xxx
Job 3 xxx
xxx
Manuf O/H APPLIED to jobs
Actual O/H incurred
Over/under recovered
Indirect Material Inventory (SFP)
Bank/creditors xxx
xxx
Manufacturing overheads xxx
xxx
Indirect Labour Control (SFP)
Bank/creditors xxx
xxx
Manufacturing overheads xxx
xxx
Job 1 (Sub-ledger)
Direct material xxx
Direct labour xxx
Manufacturing overheads xxx
xxx
Finished goods xxx
xxx
Credit total cost when job is finished
Job 2 (Sub-ledger)
Direct material xxx
xxx
xxx
Job 3 (Sub-ledger)
Direct material xxx
Direct labour xxx
Manufacturing overheads xxx
xxx
xxx
Finished Goods (SFP)
xxx
Job 1
xxx
Cost of sales xxx
xxx
Credit total COST when job is sold
Cost of Sales (P/L)
Finished goods xxx
xxx
xxx

Activities

Activity 4.1

Moz Art (Pty) Ltd manufactures curios which are sold mostly to foreign tourists at border posts entering Mozambique. Each job is unique and handmade.

The company wants you, a management accountant to help them determine the cost of each job using the job costing system.

The following balances were extracted from the books of Moz Art (Pty) Ltd on 1 March 2019:

	R
Direct material	120 000
Bank	24 500
Sales expenses	3 600

March 2019 costs have been allocated to jobs as follows:

Job	Material	Wages
	R	R
Straw Hats	18 250	12 240
Wooden Fishes	32 860	24 560
Beaded Necklaces	12 640	8 960
Colourful fabric	6 580	-

Additional information

1. Actual manufacturing costs incurred during the month are R 64 220.
2. Mark-up of 70% is added to the total of each job's cost to arrive at the selling price of the job.
3. Overheads are applied to production using the rate of 80% of direct material cost.
4. Job Straw Hats, Wooden Fishes and Beaded Necklaces were completed and transferred to the finished goods account.
5. Job Straw Hats and Beaded Necklaces were sold on 31 March 2019.

REQUIRED

a. Prepare the following general ledger accounts, properly balanced:
   - Direct material control
   - Manufacturing overhead control
   - Work-in-process control
   - Finished goods

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b. Calculate the profit or loss of Moz Art (Pty) Ltd for the month ended 31 March 2019.

[Round off all calculations to the nearest Rand.]

Revision Exercises

Revision Exercise 4.1

Ntombi Traders (Pty) Ltd manufactures customized products for their customers. The following information was obtained for the month of July 20X1:

Direct material control account – opening balance	R 26 000
Direct materials purchased during July 20X1	R 78 000

Direct materials required by the individual jobs during the month were as follows:

	R
Job A	R 32 000
Job B	R 27 000
Job C	R 15 000

The direct wages for the month (all paid in cash) were as follows:

	R
Job A (800 hours)	R 16 000
Job B (990 hours)	R 19 800
Job C (380 hours)	R 7 600

Additional information:

- Jobs A, B and C were started in July 20X1.
- Job A was completed during July 20X1 and the customer invoiced for R75 000.
- The pre-determined manufacturing allocation rate is R15 per direct labour hour.
- Actual manufacturing overhead costs for 20X1 are R 35 000.

REQUIRED

a) Prepare the following general ledger accounts for Ntombi Traders (Pty) Ltd for the month July 20X1 (also balance the accounts):
   i. Material control account
   ii. Salaries and wages control account

b) Prepare the following cost ledger accounts for Ntombi Traders (Pty) Ltd for the month July 20X1 (also balance the accounts):
   i. Job A
   ii. Job B

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c) Calculate the total over/under applied overheads (all jobs) for July 20X1 and draft a journal entry showing how this over/under application will usually be dealt with in the company's financial records at the end of the period.

Revision Exercise 4.2

Extreme Carts (Pty) Ltd manufactures highline go-carts according to their clients' specifications. You have the following information available regarding March 20X1:

	Job Greatone	**Job Meanteam**
Opening WIP – 01/03/20X1	R 20 000	-
Direct material actually used	R 8 000	R 18 000
Actual direct labour hours	8 employees worked 48 hours each on the job	16 employees worked 36 hours each on the job
Budgeted direct labour hours	400	600
Actual direct labour rate per hour	R 40	R 30
Variable manufacturing overhead rate per direct labour hour	R 12	R 12

Additional information:

- Total budgeted fixed overheads for March 20X1 were R 16 000. Fixed manufacturing overheads are recovered based on direct labour hours.
- Total actual fixed overheads for March 20X1 were R 14 000. There were no other jobs than the above two jobs being worked on or budgeted for in March 20X1.
- Job Meanteam was completed on 31 March 20X1 and immediately charged to the client at a selling price of R 65 000.
- Job Greatone was incomplete on 31 March 20X1.
- The direct materials opening balance on 1 March 20X1 was R 15 000 and additional materials with a cost price of R 38 000 was purchased in March 20X1.

REQUIRED

a) Calculate the following:
   i. Total profit or loss on Job Meanteam
   ii. Total inventory value on 31 March 20X1

b) Prepare the work-in-process control account in the general ledger for March 20X1. Balance the account properly.

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Revision Exercise 4.3

Magnificent Fans (Pty) Ltd manufactures customized industrial fans and uses a job costing system. The company wants you, a management accountant to help them determine the cost of each fan manufactured during the month of March 20X1.

The following balances were extracted from the accounting records of Magnificent Fans (Pty) Ltd on 1 March 20X1:

	R
Direct material	210 000
Bank	189 000

The following information is available for March 20X1:

	X3000	**X4520**	**X5850**
Direct material issued to jobs	R120 500	R180 300	R215 600
Direct labour hours	1 100	1 600	2 100

Additional information

1. Direct material for R440 300 was purchased during the month.
2. Labour is paid at a cost of R50 per hour.
3. Manufacturing overheads are applied to production using direct labour hours.
4. Budgeted manufacturing overhead costs for March 20X1 were R360 000. Labour hours budgeted for X3000 were 950 hours, for X4520 1 400 hours and for X5850 1 900 hours. Actual manufacturing costs incurred during the month were R372 000.
5. Magnificent Fans (Pty) Ltd applies a 30% sales margin.
6. Job X3000 and X5850 were completed and transferred to the finished goods account.
7. Job X3000 was sold on 31 March 20X1.

REQUIRED

Prepare the following general ledger accounts, properly balanced:

- Direct material control
- Wages control
- Manufacturing overhead control
- Work-in-process control
- Finished goods
- Cost of sales

Calculate the profit or loss of Magnificent Fans (Pty) Ltd for the month ended 31 March 20X1.

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Revision Exercise 4.4

Bags Galore (Pty) Ltd produces customized bags and uses a job costing system. The company wants you, a management accountant to help them determine the cost of each bag produced during the month of March 20X1.

The following balances were extracted from the accounting records of Bags Galore (Pty) Ltd on 1 March 20X1:

	R
Direct material	25 400

The following information is available for March 20X1:

	Hand Luxurious	**Sporty Deluxe**	**Leisure Galore**
Direct material issued to jobs	R1 200	R860	R1 850
Direct labour hours	6	8	10.5

Additional information

- Direct material for R2 300 was purchased during the month.
- Labour is paid at a cost of R60 per hour.
- Manufacturing overheads are applied to production using 60% of direct material cost.
- Budgeted manufacturing overhead costs for March 20X1 were R2 500. Actual manufacturing costs incurred during the month were R2 100.
- Bags Galore (Pty) Ltd applies a 60% mark-up.
- Job Hand Luxurious and Sporty Deluxe were completed during the month.
- Job Sporty Deluxe was sold on 31 March 20X1.

REQUIRED

1. Prepare the following general ledger accounts, properly balanced:
    - Direct material control
    - Manufacturing overhead control
    - Finished goods
    - Cost of sales

2. Prepare the following cost-ledger accounts, properly balanced:

    Hand Luxurious
    Leisure Galore

3. Calculate the profit or loss of Bags Galore (Pty) Ltd for the month ended 31 March 20X1.

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Learning Unit 6: Process costing systems

Learning objectives:

- Describe the users of a process costing system
- Calculate the completed units and the equivalent units for work-in-process (WIP)
- Prepare the quantity statement based on the weighted average method of inventory valuation.
- Prepare the quantity statement based on the first-in-first-out (FIFO) method of inventory valuation.
- Calculate the normal loss for a specific period, depending on the wastage point.
- Calculate the abnormal loss for a specific period, depending on the wastage point.
- Prepare the production cost statement based on the weighted average method of inventory valuation.
- Prepare the production cost statement based on the first-in-first-out (FIFO) method of inventory valuation.
- Prepare the allocation statement based on the weighted average method inventory valuation.
- Prepare the allocation statement based on the first-in-first-out (FIFO) method of inventory valuation.
- Record process costs in the general ledger.
- Allocate process costs in the general ledger.

Material used for this learning unit:

- Chapter 9 of the prescribed textbook

Prescribed material used for this learning unit:

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

Study the following subsections in chapter 9:

- Process costing when all output is fully complete
  - No losses within the process
  - Normal losses within process with no scrap value
  - Abnormal losses in process with no scrap value
- Process costing with ending work in progress partially complete
  - Elements of costs with different degrees of completion
- Beginning and ending work in progress of uncompleted units
- Partially completed output and losses in process
  - Appendix 5.1: Losses in process and partially completed units

My notes

Introduction

Certain products are produced as a part of a process, for example chemicals, medicines, beverages, processed foods, etc. These products are produced on a continuous basis for a general market, i.e. not for a particular client and not according to their specifications. There is nothing unique about the product, products are produced in masses.

The challenge, which we will cover in this learning unit, is to determine the cost per product due to units being identical and produced in masses. The purpose of a process costing system is to help us determine the cost per unit of output to set prices, report profits accurately and for the valuation of inventory in terms of the International Financial Reporting Standard on Inventory (IAS 2).

In this learning unit, we will describe the users of a process costing system. We will look at how to calculate the completed units and the equivalent units for work-in-process (WIP). We will further prepare the quantity statement using the weighted average and first-in-first-out (FIFO) methods of inventory valuation. Thereafter we calculate the normal loss for a specific period, depending on the wastage point.
It is the above process that will allow us to prepare the production cost statement based on both the weighted average method and first-in-first-out (FIFO) methods of inventory valuation.

We will also look at the normal loss and the abnormal loss for a specific period, depending on the wastage point. We look at how to prepare the allocation of statement based on the weighted average and First- in- First- Out methods of inventory valuation. We will conclude by looking at how to record and allocate costs in the general ledger.

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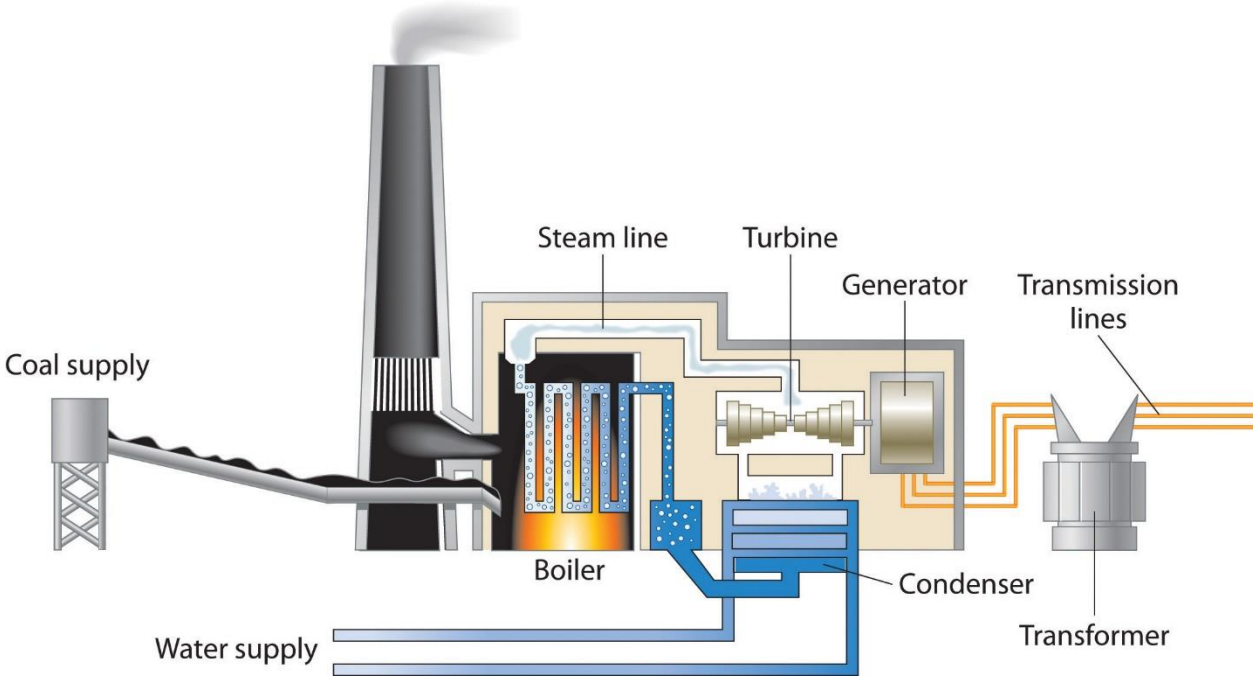
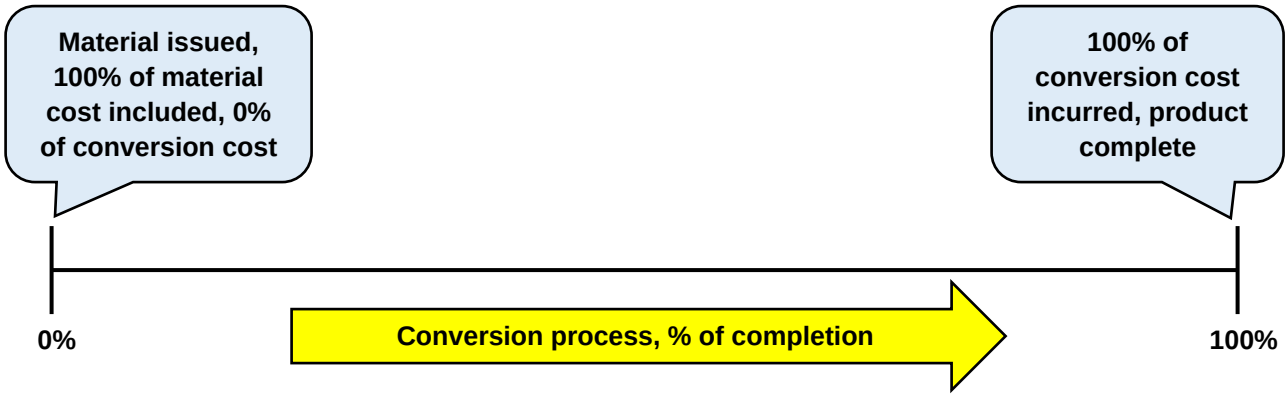
The following is an example of the process of how electricity is produced:



Flow of production by means of a single process

For MFAC6211 we will only be dealing with a single process. For purposes of this module you can also assume that material will always be added at the beginning of the process and conversion will take place evenly throughout the process. The following figure is an illustration of how input of material is converted to the final product of output:


Material issued, 100% of material cost included, 0% of conversion cost
100% of conversion cost incurred, product complete
0%
Conversion process, % of completion
100%

During the conversion process the raw material is converted into the final product. Remember that conversion cost includes labour and manufacturing overheads. Therefore, all the components of product cost are included in the end: direct material, direct labour, manufacturing overheads.

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Work-in-process (WIP), equivalent units and the quantity statement

In practice, it will never be the case where all units have been started in the current period and all units have been completed in the current period. Therefore, units for the period will consist of the following:

- Units that have been transferred from a previous period that have been started in that period, but were not completed in that period, therefore need to be completed in the current period. This is called Opening WIP.
- Units that have been started and completed in the current period.
- Units that have been started in the current period, but at the end of the period have not been completed yet. This is called Closing WIP.

The problem is that we need to calculate a cost per unit for accounting purposes; and now we have some units that are partially completed and some units that have been completed, but these units are not necessarily separately identifiable. To overcome this problem, a concept called equivalent units has been introduced.

Equivalent units

When we have units that have been partially completed, we convert these units into a comparable number of fully completed units and these units are then called equivalent units. What this means is that if we have 1 000 units that have been 60% complete in terms of conversion, we will have 600 completed units in terms of conversion. Therefore 600 equivalent units. If unit costs are R 20 per unit, the total cost would be R 20 x 600 units = R 12 000.

We will use the quantity statement for calculating equivalent units where we distinguish between physical units (the incomplete units which can physically be counted) and the equivalent units (the partially completed units converted to equivalent completed units). When we calculate equivalent units we also need to distinguish between the different components of product cost (material and conversion cost) since material is added at the beginning of the process and conversion takes place evenly throughout the process, as noted earlier in this learning unit.

Since material is always added at the beginning of the process (when the process is 0% complete) the equivalent units for material will always be calculated based on 100% of completion.

Conversion (labour and overheads) takes place evenly throughout the process and therefore if 30% of conversion has been done in the period, 30% of the units will be equivalent to completed units.

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If units were transferred from a prior process, it must be noted that material was already added in the previous process (at the start of the process) and that only a certain amount of conversion still needs to be done. Therefore, if Opening WIP units were received in this period being 40% complete, only 60% conversion needs to take place in the current period and therefore the equivalent units in terms of conversion will be 60% of physical units.

Activity 6.1

Stay Soft (Pty) Ltd manufactures detergent in a single process and make use of a process costing system.

The following information is available for April 20X1:

Opening WIP	80 000 units
Conversion	30% complete
New units started/put into production	300 000 units
Closing WIP	60 000 units
Conversion	60% complete

Material is added at the beginning of the process and conversion takes place evenly throughout the process.

REQUIRED

Calculate the following:

a) The equivalent units included in opening WIP (separately for material and conversion).
b) The production work required to complete opening WIP (in terms of equivalent units).
c) The units completed.
d) The equivalent units included in closing WIP.

Inventory valuation methods

We need to distinguish between two inventory valuation methods: The First-in-first-out (FIFO) and weighted average method of inventory valuation.

With the weighted average method, we add together all units to calculate a weighted average cost per unit, whilst with the FIFO method we split the units between units received from Opening WIP and units started and completed in the current month.

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The quantity statement

The quantity statement is used to calculate the equivalent units. The equivalent units are based on the physical units and percentage of completion of both material and conversion.

Illustrative example 1

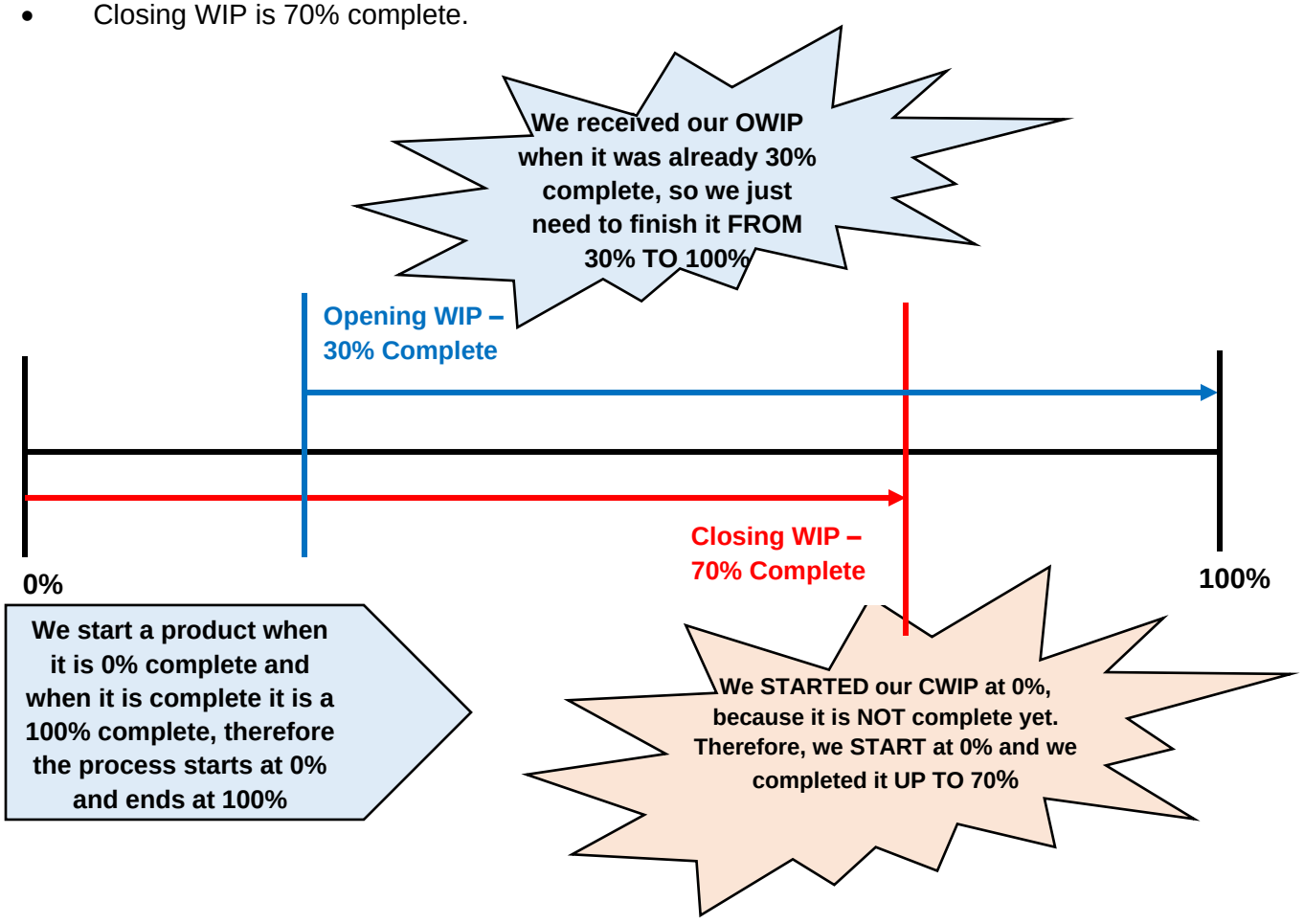
Fresh Fruit (Pty) Ltd manufactures fruit juice in a single process and makes use of a process costing system.

The following information has been obtained for June 20X1:

Opening WIP (30% complete)	50 000	units
Put into production	180 000	units
Completed and transferred	200 000	units
Closing WIP	30 000	units

Additional information

- The company uses the FIFO method of inventory valuation.
- Closing WIP is 70% complete.


We received our OWIP when it was already 30% complete, so we just need to finish it FROM 30% TO 100%
Opening WIP – 30% Complete
Closing WIP – 70% Complete
0%
100%
We start a product when it is 0% complete and when it is complete it is a 100% complete, therefore the process starts at 0% and ends at 100%
We STARTED our CWIP at 0%, because it is NOT complete yet. Therefore, we START at 0% and we completed it UP TO 70%

THIS STATEMENT IS ABOUT QUANTITIES!!

Quantity Statement - FIFO

Physical Units			Equivalent Units			
			Material		Conversion	
Input	Description	Outputs	Units	%	Units	%
50 000	Opening WIP					
180 000	Put into Production					
	Completed and Transferred:	**200 000**	**150 000**		**185 000**	
	- Opening WIP	50 000	-	0%	35 000	70%
	- Current Production	150 000	150 000	100%	150 000	100%
	Closing Stock	30 000	30 000	100%	21 000	70%
230 000		**230 000**	**180 000**		**206 000**	

This is a balancing figure: 200 000 – 50 000

What you still must complete in the current process

Input ALWAYS equals Output

ALWAYS 0%

% up to where CWIP was completed

The following is an illustration of how the Quantity Statement would differ should the company make use of the weighted average method of inventory valuation:

Quantity Statement – Weighted Average

Physical Units			Equivalent Units			
			Material		Conversion	
Input	Description	Outputs	Units	%	Units	%
50 000	Opening WIP					
180 000	Put into Production					
	Completed and Transferred	200 000	200 000	100%	200 000	100%
	Closing Stock	30 000	30 000	100%	21 000	70%
230 000		**230 000**	**230 000**		**221 000**	

This line is the only difference between the 2 methods

Losses

Thus far we have dealt with a process costing system in an ideal situation. However, in practice there will always be losses. Losses are units lost in the production process due to, for example, evaporation and spillage. The input units (what was put into production) will never be equal to the output units (units completed and transferred). These losses can be classified as either normal or abnormal losses.

Normal versus abnormal losses

The table below is a comparison of normal losses versus abnormal losses:

Normal losses	Abnormal losses
These losses are also called uncontrollable losses. They exist due to the nature of the business. You cannot avoid or control them. They are inherent to the business and will be there regardless.	These losses are also called controllable losses. They are not a part of the nature of the business. You can avoid or control them.
You will set a percentage of what would be expected to be the normal loss based on past experience. This percentage is what the organisation deems acceptable as a loss in a normal production run. It does not indicate that the process is ineffective.	The abnormal loss are all units lost that were not within the expected parameter of the organization. The abnormal loss units indicate ineffectiveness of the process.

Examples: • Evaporation in a chemical process • Off-cuts of materials where clothes are produced • Any units rejected within the acceptable parameter (estimated percentage of normal loss)	Examples: • Wastage due to the use of raw material of inferior quality • Wastage due to employee carelessness • Wastage due to production interruption (due to, for example, electricity failure)

The "where" wastage occurs versus the "how many units" were lost

The below is an extract from a question:

"Wastage occurs when the process is 70% complete. Normal wastage amounts to 5% of inputs that reach the wastage point."

From this extract we can determine the following: The 70% is the point in the process "where" the wastage takes place (the wastage point). This is important to know, because in terms of conversion cost on your quantity statement you have incurred 70%, which means that your equivalent units for the normal loss for conversion would be equal to the

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physical units lost times the 70%. This is because you have been paying conversion costs up until 70% of the process where you then lost the units, after which you no longer have to pay conversion costs on those lost units anymore.

The 5% is used to determine the "how many units" of the normal loss. To calculate the "how many units" of the normal loss you first need to calculate how many units were subject to the normal loss and then times that by the 5%. This would be the physical units of the normal loss.

From this you can conclude that the 70% would be used to calculate the **equivalent units** in terms of conversion cost and the 5% would be used to calculate the **physical units** in your output column.

Calculating the normal loss in units

As mentioned above, to calculate the normal and abnormal loss units you need the point in the process where the loss occurred to determine how many units were subject to loss point and you will need the percentage of units lost to calculate the number of physical units lost. The point in the process where the loss occurs will then also be used to calculate the equivalent units in terms of conversion costs for use in the quantity statement.

The below Illustrative example demonstrates the calculation of the normal loss units in different scenarios:

Illustrative example 2

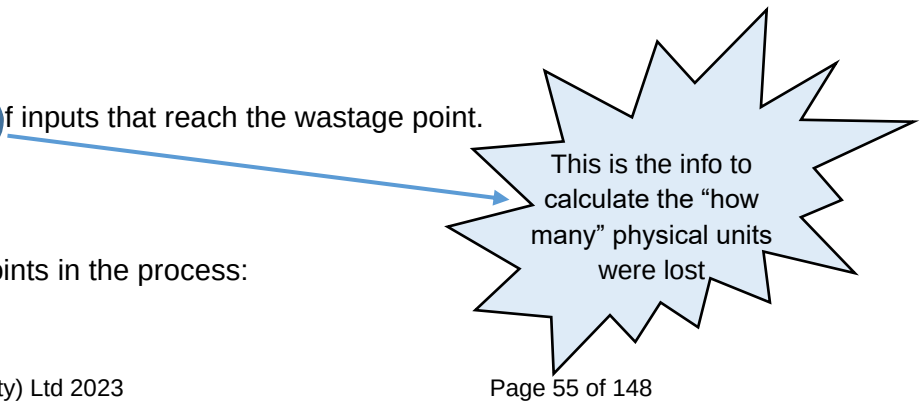
Fresh Fruit (Pty) Ltd manufactures fruit juice in a single process and makes use of a process costing system.

The following information has been obtained for June 20X1:

Opening WIP (30% complete)	50 000	units
Put into production	180 000	units
Completed and transferred	200 000	units
Closing WIP	25 000	units

Additional information

- Closing WIP is 70% complete.
- Normal losses amount to 2% of inputs that reach the wastage point.



REQUIRED

Losses occur at the following points in the process:

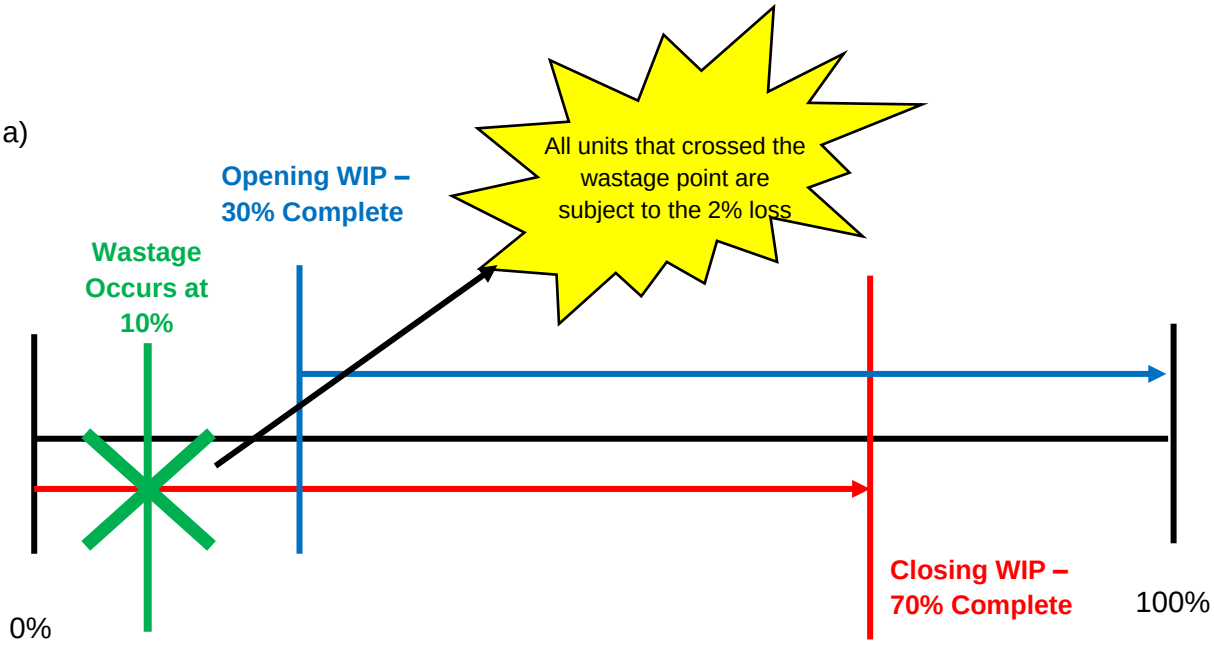
a) 10%
b) 50%
c) 100%

This is to calculate "where" in the process (the wastage point) wastage occurred. Therefore, to calculate equivalent units for conversion.

REQUIRED

Calculate the normal loss in units if losses occur as mentioned above.

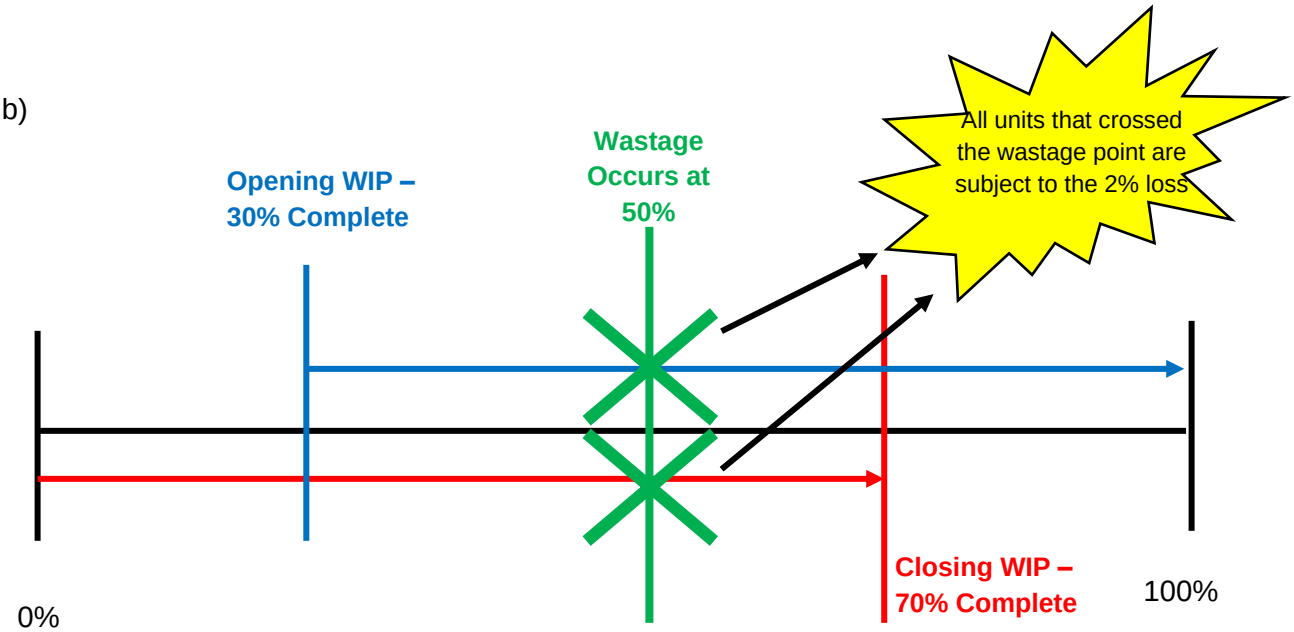
a)


All units that crossed the wastage point are subject to the 2% loss
Opening WIP – 30% Complete
Wastage Occurs at 10%
Closing WIP – 70% Complete
0%
100%

Calculating the normal loss:

Total input (50 000 + 180 000)	230 000
Subtract units that did not cross the wastage point:	
Opening WIP	(50 000)
Units subject to loss	**180 000**
Normal loss @ 2%	3 600

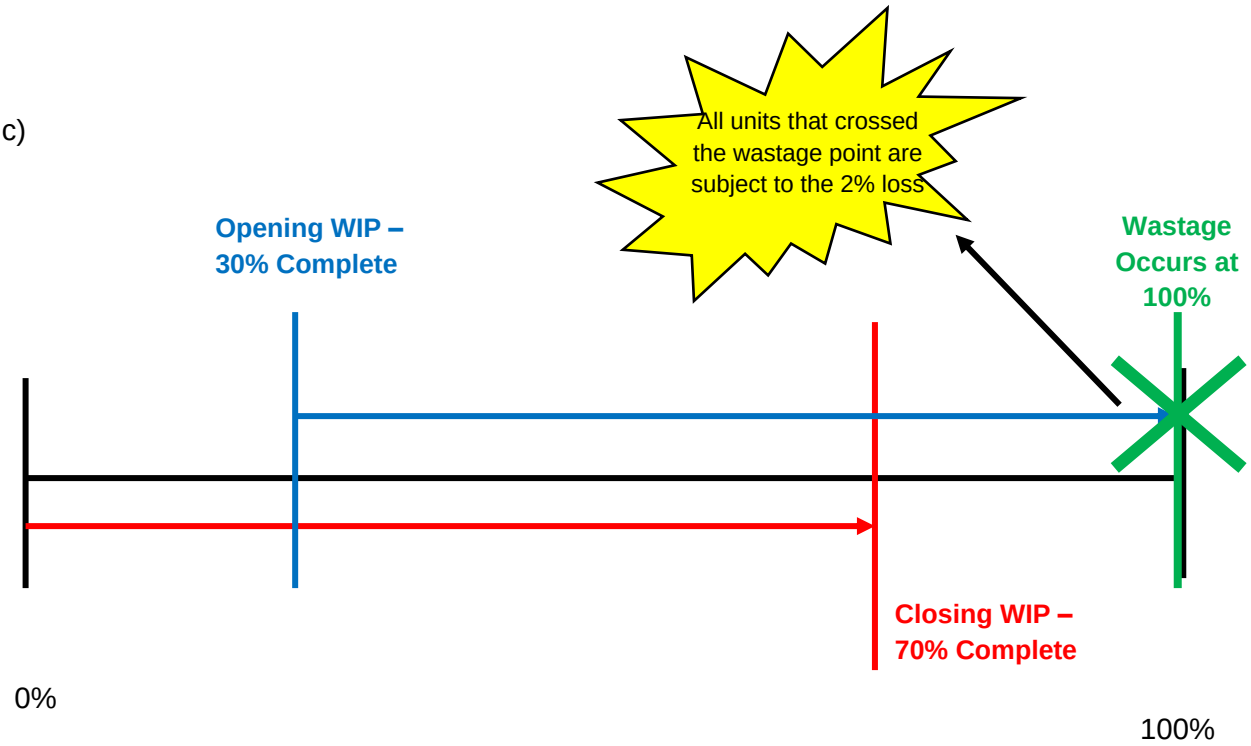
b)


All units that crossed the wastage point are subject to the 2% loss
Wastage Occurs at 50%
Opening WIP – 30% Complete
Closing WIP – 70% Complete
0%
100%

Calculating the normal loss:

Total input (50 000 + 180 000)	230 000
Subtract units that did not cross the wastage point:	
All units crossed the wastage point	(-)
Units subject to loss	**230 000**
Normal loss @ 2%	4 600

c)


All units that crossed the wastage point are subject to the 2% loss
Opening WIP – 30% Complete
Wastage Occurs at 100%
Closing WIP – 70% Complete
0%
100%

Calculating the normal loss:	
Total input (50 000 + 180 000)	230 000
Subtract units that did not cross the wastage point:	
Closing WIP	(25 000)
Units subject to loss	**205 000**
Normal loss @ 2%	4 100

Losses in the quantity statement

There will now be two-line items added in the quantity statement: Normal losses and abnormal losses. After calculating the number of units of the normal loss as per 4.3 above, this will be transferred to the quantity statement. Remember that the calculation of the normal loss in 4.3 was the loss of **physical** units. In terms of **equivalent** units, you now must use the wastage point (percentage in the process where losses occur) to calculate the equivalent units for conversion. Equivalent units for material will still be calculated as a 100% of physical units since all materials have been added at the beginning of the process.

Illustrative example 3

Using the information provided in Illustrative example 2, prepare the following:

a) The quantity statement according to the FIFO method of inventory valuation if all wastage occurs at the end of the process.
b) The quantity statement according to the weighted average method of inventory valuation if all wastage occurs when the process is 10% complete.

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a)

Quantity Statement - FIFO - opening stock completed includes units wasted

Physical Units			Equivalent Units			
			Material		Conversion	
Input	Description	Outputs	Units	%	Units	%
50 000	Opening WIP					
180 000	Put into Production					
	Completed and Transferred from:	**200 000**				
	- Opening WIP	49 000	-	0%	34 300	70%
	- Current Production	151 000	151 000	100%	151 000	100%
	Normal Loss	4 100	4 100	100%	4 100	100%
	Abnormal Loss	900	900	100%	900	100%
	Closing WIP	25 000	25 000	100%	17 500	70%
230 000		**230 000**	**181 000**		**207 800**	

What you still must complete in the current process

This is a balancing figure: 200 000 – 49 000

% WHERE wastage occurs

Input ALWAYS equals Output

ALWAYS 100%

% up to where CWIP was completed

Our Opening WIP went through the wastage point, THEREFORE we LOST 2% of it

This is a balancing figure: 230 000 – 200 000 – 4 100 – 25 000

ALWAYS 0%

b)

Quantity Statement – Weighted Average

Physical Units			Equivalent Units			
			Material		Conversion	
Input	Description	Outputs	Units	%	Units	%
50 000	Opening WIP					
180 000	Put into Production					
	Completed and Transferred	200 000	200 000	100%	200 000	100%
	Normal Loss	3 600	3 600	100%	360	10%
	Abnormal Loss	1 400	1 400	100%	140	10%
	Closing WIP	25 000	25 000	100%	17 500	70%
230 000		**230 000**	**230 000**		**218 000**	

% up to where CWIP was completed

% WHERE wastage occurs

Input ALWAYS equals Output

This is a balancing figure: 230 000 – 200 000 – 3 600 – 25 000

This line is the only difference regarding the format between the two methods. You now don't have two separate line items for Opening WIP and Current production, but just one line for Completed and transferred, ALWAYS 100% for BOTH material and conversion.

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Activity 6.2

Delicious Rusks (Pty) Ltd produces one product in a single process and uses a process costing system. The following information is available for June 20X1:

	Units
Work-in-process:	
1 June 20X1 – 30% completed	180 000
30 June 20X1 – 80% completed	110 000
Started (put into production) in June	420 000
Completed in June	460 000

Additional information:

- Raw materials are added at the beginning of the process and conversion takes place evenly throughout the process.
- Normal losses are estimated as 5% of units that reach the wastage point.

REQUIRED

a) Prepare the quantity statement according to the weighted average method of inventory valuation, assuming wastage takes place when the process is 20% complete.
b) Prepare the quantity statement according to the FIFO method of inventory valuation, assuming wastage takes place at the end of the process.

Production cost statement

Once you have completed the quantity statement, you can now do the production cost statement. The purpose of the production cost statement is to calculate the average cost per unit. To do this, you need the cost incurred for the period and the equivalent units calculated in the quantity statement. The calculation for the FIFO and weighted average methods of inventory valuation will once again be done differently.

Illustrative example 4

For this example, use the quantity statements prepared in Illustrative example 3. In addition, the following cost information is available for June 20X1:

		R
WIP:	1 June 20X1	
	Material	120 000
	Conversion	250 000
Material added during June 20X1		520 000

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Labour for June 20X1	650 000
Overheads for June 20X1	320 000

REQUIRED

Prepare the following:

a) The production cost statement according to the FIFO method of inventory valuation if all wastage occurs at the end of the process. Use the quantity statement prepared in a) of Illustrative example 3.
b) The production cost statement according to the weighted average method of inventory valuation if all wastage occurs when the process is 10% complete. Use the quantity statement prepared in b) of Illustrative example 3.

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a) Production cost statement - **FIFO**

	Total	Material	Conversion
Opening WIP	370 000	-	-
Current Production	1 490 000	520 000	970 000
TOTAL	**1 860 000**	**520 000**	**970 000**
Equivalent Units		181 000	207 800
Average Cost per Unit	**7.54**	**2.87**	**4.67**

For FIFO these totals will always be ZERO

Cost per unit = Total Cost / Equivalent units, i.e. 520 000 / 181 000 and 970 000 / 207 800

These are the units as per the equivalent statement

b) Production cost statement – **Weighted Average**

	Total	Material	Conversion
Opening WIP	370 000	120 000	250 000
Current Production	1 490 000	520 000	970 000
TOTAL	**1 860 000**	**640 000**	**1 220 000**
Equivalent Units		230 000	218 000
Average Cost per Unit	**8.38**	**2.78**	**5.60**

For weighted average these totals will always be included

Cost per unit = Total Cost / Equivalent units, i.e. 640 000 / 230 000 and 1 220 000 / 218 000

These are the units as per the equivalent statement

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Activity 6.3

The following quantity statement is available for Delicious Rusks (Pty) Ltd for June 20X1:

Physical Units			Equivalent Units			
			Material		Conversion	
Input	Description	Outputs	Units	%	Units	%
180 000	Opening WIP					
420 000	Put into Production					
	Completed and Transferred	460 000	460 000	100%	460 000	100%
	Normal Loss	21 000	21 000	100%	4 200	20%
	Abnormal Loss	9 000	9 000	100%	1 800	20%
	Closing WIP	110 000	110 000	100%	88 000	80%
600 000		**600 000**	**600 000**		**554 000**	

In addition, the following cost information is available for June 20X1:

		R
WIP:	1 June 20X1	
	Material	260 000
	Conversion	380 000
Material added during June 20X1		630 000
Labour for June 20X1		420 000
Overheads for June 20X1		380 000

REQUIRED

Prepare the production cost statement for June 20X1 under the assumption that Delicious Rusks (Pty) Ltd uses the weighted average method of inventory valuation.

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Activity 6.4

The following quantity statement is available for Delicious Rusks (Pty) Ltd for June 20X1:
In addition, the following cost information is available for June 20X1:

Physical Units			Equivalent Units			
			Material		Conversion	
Input	**Description**	**Outputs**	**Units**	**%**	**Units**	**%**
180 000	Opening WIP					
420 000	Put into Production					
	Completed and Transferred from:	**460 000**				
	- Opening Stock	171 000	-	0%	119 700	70%
	- Current Production	289 000	289 000	100%	289 000	100%
	Normal Loss	24 500	24 500	100%	24 500	100%
	Abnormal Loss	5 500	5 500	100%	5 500	100%
	Closing WIP	110 000	110 000	100%	88 000	80%
600 000		**600 000**	**429 000**		**526 700**	

In addition, the following cost information is available for June 20X1:

		R
WIP:	1 June 20X1	
	Material	260 000
	Conversion	380 000
Material added during June 20X1		630 000
Labour for June 20X1		420 000
Overheads for June 20X1		380 000

REQUIRED

Prepare the production cost statement for June 20X1 under the assumption that Delicious Rusks (Pty) Ltd uses the FIFO method of inventory valuation.

Allocation statements

Ultimately, we want to value closing inventory in the financial statements. This is done in the allocation statements. If you think back to what we have done earlier in this module, inventory is made up of:

- Raw materials;
- Work-in-progress; and

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- Finished/Completed goods

So how is cost allocated to these accounts? To get the total cost of inventory you would times the number of units with the cost per unit. The number of units from the quantity statement (**equivalent** units) will be used and the cost per the production cost statement will be used.

Once again there will be a difference between the weighted average method and the FIFO method of inventory valuation. The difference would be in the structure/layout of the allocation statement as illustrated below.

The cost allocation statement is made up of the following line items:

	Line item	**Weighted average method**	**FIFO method**
1	Opening WIP	N/A	Included
2	Current production	N/A	Included
3	Completed and transferred	Included	Included (this will only be a total line of 1) and 2) above)
4	Abnormal loss	Included	Included
5	Closing WIP	Included	Included

As per the above you will see that there are separate line items for Opening WIP and Current production for the FIFO method of inventory valuation which was also the case with the quantity statement. Basically, the line items in the allocation statement are the line items as per the quantity statement, except that there is no line item for the normal loss. Why is this? The normal loss is a part of the nature of the business – **it is inherent to the production process.** In terms of International Financial Reporting Standards (IFRS), normal losses should be included in inventory, therefore be allocated to the other components of inventory. This is why we allocate the normal loss. To include it in the cost of the other components of inventory.

Note that abnormal losses are not a part of inventory and will be treated as a period cost in the financial statements.

Calculating the Rand value of the normal loss

As mentioned above, the normal loss needs to be allocated to the other line items as per the allocation statement. To do this, we need to first calculate the Rand value of the normal loss. Now remember, in the allocation statement we are working with equivalent units and cost per unit. The cost per unit can be obtained from the production cost statement. What are equivalent units made up of? Units for materials and units for conversion. These units are not necessarily the same. As per the production cost statement we also have a

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different cost for material and conversion. Therefore, the Rand value of the normal loss will be made up of a Rand value for material and a Rand value for conversion.

Illustrative example 5

For this example, use the information given in Illustrative example 3 and 4 and calculate the following:

REQUIRED

a) Calculate the Rand value of the normal loss according to the FIFO method of inventory valuation.
b) Calculate the Rand value of the normal loss according to the weighted average method of inventory valuation.

a) Rand value of the normal loss = Rand value of the normal loss for material + Rand value of the normal loss for conversion

Rand Value of the Normal loss		**R**
Material	(4 100 units x R 2.87)	11 767
Conversion	(4 100 units x R 4.67)	19 147
Total		**30 914**

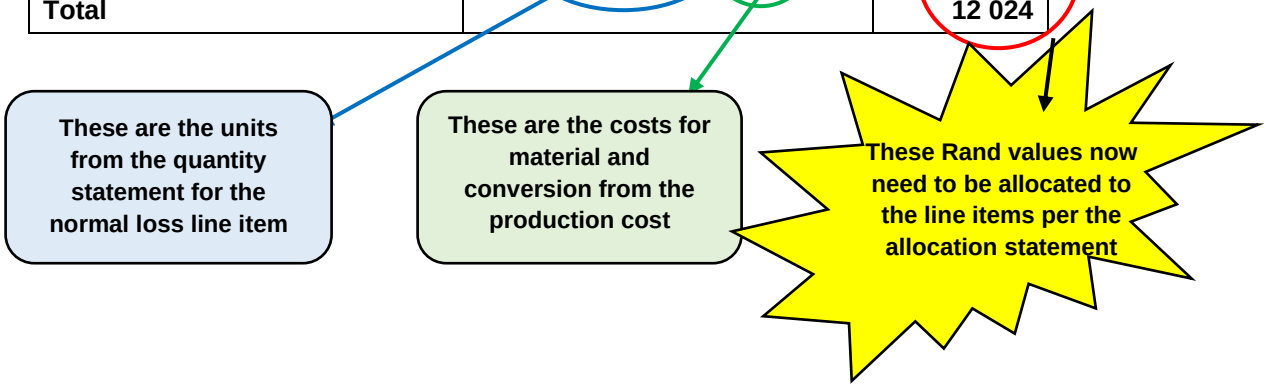
These are the units from the quantity statement for the normal loss line item

These are the costs for material and conversion from the production cost

These Rand values now need to be allocated to the line items per the allocation statement

b) Rand value of the normal loss = Rand value of the normal loss for material + Rand value of the normal loss for conversion

Rand Value of the Normal loss		R
Material	(3 600 units x R 2.78)	10 008
Conversion	(360 units x R 5.60)	2 016
Total		**12 024**


These are the units from the quantity statement for the normal loss line item
These are the costs for material and conversion from the production cost
These Rand values now need to be allocated to the line items per the allocation statement

Allocation of the Rand value of the normal loss

The Rand value calculated should now be allocated to inventory as required by IFRS (noted above). The Rand value will be allocated to the following line items for both material and conversion:

- Completed and transferred
- Abnormal loss
- Closing WIP

It is important to note that if Opening WIP or Closing WIP did not go through the wastage point, the Rand value will not be allocated to these line items since units were not subject to loss.

Illustrative example 6

For this example, use the information given in Illustrative example 5 (including the information given for Illustrative examples 3 and 4).

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REQUIRED

Allocate the Rand value of the normal loss for purposes of preparing the cost allocation statement based on the following:

a) FIFO method of inventory valuation.
b) Weighted average method of inventory valuation.

a)

Allocated to:	**Material**	**Conversion**	**Total**
Completed and transferred	11 697	19 054	30 752
Abnormal loss	70	93	162
Closing WIP	-	-	-
Total cost of normal loss	**11 767**	**19 147**	**30 914**
Equivalent units	151 900	186 200	

These total amounts are going to your Allocation Statement

Note that closing WIP did not go through normal loss

Check your timeline – you can only allocate the loss to units that went through the wastage point

Recalculate your units with what is "left" when taking out normal loss units, i.e., 0 + 151 000 + 900 = 151 900 (Closing WIP did NOT go through loss)

Allocate the Rand value calculated to the line items, i.e.,
11 767 x 151 000 / 151 900 = 11 697;
11 767 x 900 / 151 900 = 70;
19 147 x (34 300 + 151 000) / 186 200 = 19 054;
19 147 x 900 / 186 200 = 93

b)

Allocated to:	**Material**	**Conversion**	**Total**
Completed and transferred	8 841	1 853	10 694
Abnormal loss	62	1	63
Closing WIP	1 105	162	1 267
Total cost of normal loss	**10 008**	**2 016**	**12 024**
Equivalent units	226 400	217 640	

These total amounts are going to your Allocation Statement

Note that opening WIP did not go through normal loss

Check your timeline – you can only allocate the loss to units that went through the wastage point. However, this is the weighted average method. If this was the FIFO method, you would have deducted opening WIP from the completed and transferred.

Recalculate your units with what is "left" when taking out normal loss units, i.e. 200 000 + 1 400 + 25 000; 200 000 + 140 + 17 500.

Allocate the Rand value calculated to the line items, i.e.
10 008 x 200 000 / 226 400 = 8 841;
10 008 x 1 400 / 226 400 = 62;
10 008 x 25 000 / 226 400 = 1 105;
2 016 x 200 000 / 217 640 = 1 853;
2 016 x 140 x 217 640 = 1;
2 016 x 17 500 / 217 640 = 162

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Preparation of the allocation statement

As mentioned earlier, the allocation statement is prepared to allocate costs to line items of inventory. You will make use of equivalent units per the quantity statement and the cost per unit per the production cost statement. It is important to note that these units and costs are subdivided into material and conversion. Therefore, there will be separate line items for costs of material and conversion underneath each section of the allocation statement. Further to this, there will also be a line item for the normal loss as Rand value allocated above.

Illustrative example 7

For this example, use the information given in Illustrative example 6 (including the information given for Illustrative examples 3, 4 and 5).

REQUIRED

Prepare the allocation statements based on the following:

a) FIFO method of inventory valuation.
b) Weighted average method of inventory valuation.

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a)

Allocation Statement - FIFO

Opening WIP		
Material		120 000
Conversion		250 000
Sub-total allocated		**370 000**
Current period production activities		
Material	*151 000 x R 2.87*	433 370
Conversion	*(151 000 + 34 300) x R 4.67*	865 351
Normal loss		30 752
Sub-total allocated		**1 329 473**
Completed and transferred		**1 699 473**
Abnormal loss		
Material	*900 x R 2.87*	2 583
Conversion	*900 x R 4.67*	4 203
Normal loss		162
Sub-total allocated		**6 948**
Closing WIP		
Material	*25 000 x R 2.87*	71 750
Conversion	*17 500 x R 4.67*	81 725
Normal Loss		-
Sub-total allocated		**153 475**
Total cost allocated		**1 859 896**
Rounding difference		104
Total cost per production cost statement		**1 860 000**

These are your costs for OWIP as given in the information

You will have a heading for each line as per the quantity statement, except normal loss

Units from the quantity statement

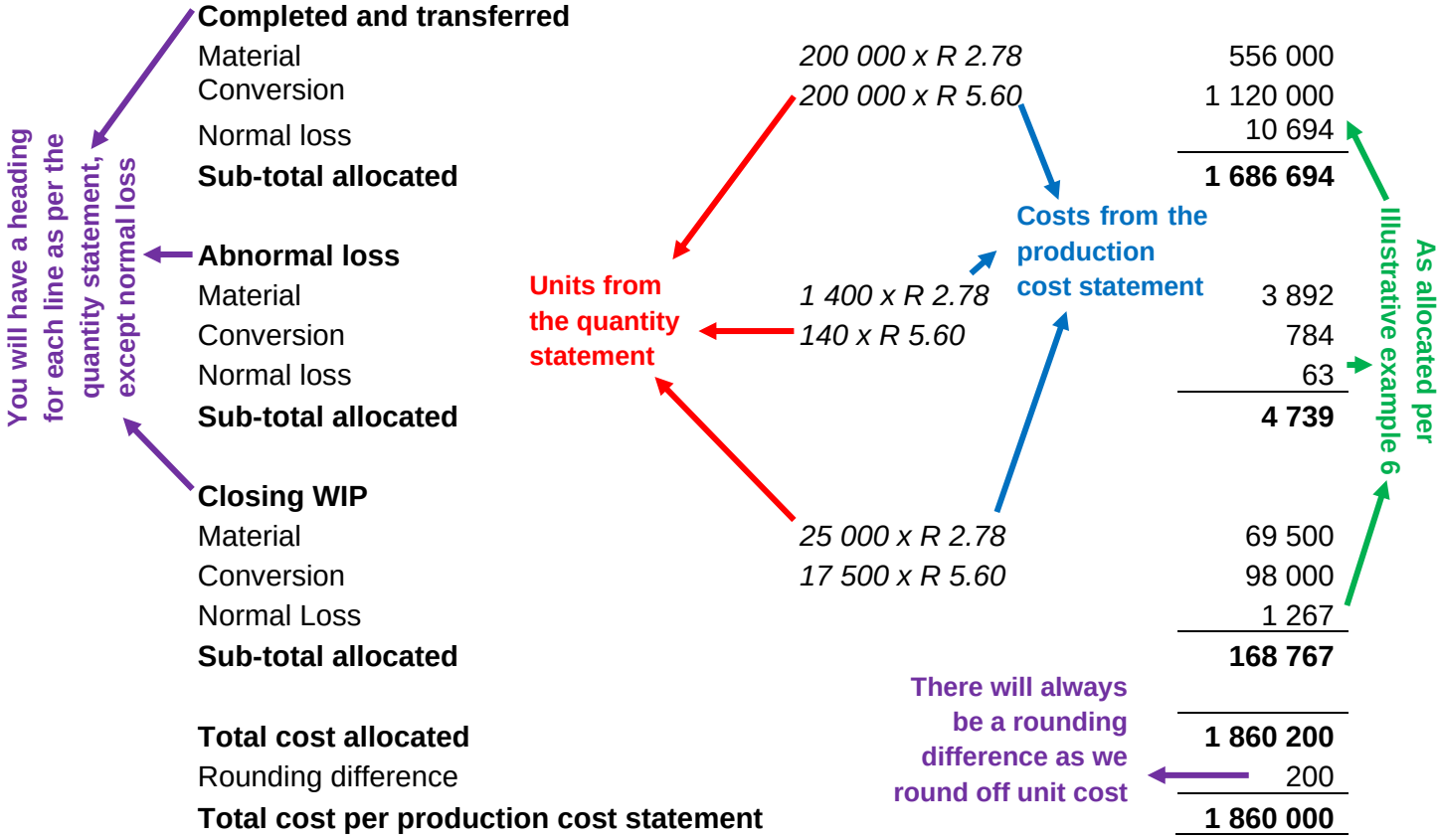
Costs from the production cost statement

As allocated per Illustrative example 6

There will always be a rounding difference as we round off unit cost

b)

Allocation Statement - Weighted Average


You will have a heading for each line as per the quantity statement, except normal loss
Units from the quantity statement
Costs from the production cost statement
As allocated per Illustrative example 6
There will always be a rounding difference as we round off unit cost

Completed and transferred		
Material	*200 000 x R 2.78*	556 000
Conversion	*200 000 x R 5.60*	1 120 000
Normal loss		10 694
Sub-total allocated		**1 686 694**
Abnormal loss		
Material	*1 400 x R 2.78*	3 892
Conversion	*140 x R 5.60*	784
Normal loss		63
Sub-total allocated		**4 739**
Closing WIP		
Material	*25 000 x R 2.78*	69 500
Conversion	*17 500 x R 5.60*	98 000
Normal Loss		1 267
Sub-total allocated		**168 767**
Total cost allocated		**1 860 200**
Rounding difference		200
Total cost per production cost statement		**1 860 000**

Activity 6.5

Refer to the information in Activity 6.3.

REQUIRED

Prepare the allocation statement for June 20X1 under the assumption that Delicious Rusks (Pty) Ltd uses the weighted average method of inventory valuation. You can assume that wastage takes place when the process is 20% complete.

Activity 6.6

Refer to the information in Activity 6.4.

REQUIRED

Prepare the allocation statement for June 20X1 under the assumption that Delicious Rusks (Pty) Ltd uses the FIFO method of inventory valuation. You can assume that wastage takes place at the end of the process.

Revision Exercises

Revision Exercise 6.1

Moca Cola (Pty) Ltd manufactures one product in a single process and uses a process costing system. The following information is available for April 20X1.

	Units
Work-in-process:	
1 April 20X1 – 40% completed	250 000
30 April 20X1 – 80% completed	180 000
Put into production in April	320 000
Completed and transferred in April	360 000

Additional information:

- The company uses the weighted average method of inventory valuation.
- Raw materials are added at the beginning of the process and conversion takes place evenly throughout the process.
- Normal losses are estimated as 3% of units that reach the wastage point. Wastage occurs when the process is 60% complete.
- Cost information for April 20X1 was as follows:

	Material	**Conversion**
	R	**R**
Work in process (1 April 20X1)	1 460 000	840 000
Current production cost	1 790 000	1 360 000

REQUIRED

a) Prepare the quantity statement.
b) Prepare the production cost statement.
c) Prepare the cost allocation statement.

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Revision Exercise 6.2

Tear Chip (Pty) Ltd manufactures one product in a single process and uses a process costing system. The following information is available for September 20X1.

	Units
Work-in-process:	
1 September 20X1 – 20% completed	36 000
30 September 20X1 – 60% completed	22 000
Put into production in September	110 000
Completed and transferred in September	105 000

Additional information:

- The company uses the FIFO method of inventory valuation.
- Raw materials are added at the beginning of the process and conversion takes place evenly throughout the process.
- Normal losses are estimated as 10% of units that reach the wastage point. Wastage occurs when the process is 80% complete.
- Cost information for September 20X1 was as follows:

	Material	**Conversion**
	R	**R**
Work in process (1 September 20X1)	240 000	360 000
Current production cost	520 000	880 000

REQUIRED

a) Prepare the quantity statement.
b) Prepare the production cost statement.
c) Prepare the cost allocation statement.

Revision Exercise 6.3

Magnificent Process (Pty) Ltd manufactures a single product and uses a process costing system. The company recorded the following information for the month of August 20X1:

	Units
Opening WIP (1 August) 60% complete	16 000
Closing WIP (31 August) 75% complete	18 000
New units put into production in August 20X1	70 000
Completed in August 20X1	60 000

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Additional information:

- Normal losses are estimated at 4% of units that reaches the wastage point.
- Normal losses occur when the process is 70% complete.
- Raw materials are added at the beginning of the process and conversion takes place evenly throughout the process.

REQUIRED

a) Prepare the quantity statement for August 20X1 based on the weighted average method of inventory valuation.
b) Assume now that losses occur when the process is 90% complete. Prepare the quantity statement for August 20X1 based on the new wastage point and the FIFO method of inventory valuation.

Revision Exercise 6.4

ToothBest (Pty) Ltd manufactures a single product and applies a process costing system. Materials are added at the beginning of the process and conversion takes place evenly throughout the process. The following information is available for the month ended February 20X1:

		Costs (R)	
	Units	**Material**	**Conversion**
Opening work-in-process	70 000	260 500	189 050
Put into production	210 000	1 010 000	620 780

Additional information:

- Normal wastage is calculated as 6 out of every 50 units of the inputs that reach the wastage point.
- A management accountant has prepared the following quantity statement as at 28 February 20X1:

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Quantity statement for February 20X1:

Physical Units			Equivalent Units			
			Material		Conversion	
Input	Description	Outputs	Units	%	Units	%
70 000	Opening WIP					
210 000	Put into Production					
	Completed and Transferred from:	**180 000**				
	- Opening WIP	70 000	-	0%	21 000	30%
	- Current Production	110 000	110 000	100%	110 000	100%
	Normal Loss	18 000	18 000	100%	7 200	40%
	Abnormal Loss	22 000	22 000	100%	8 800	40%
	Closing WIP	60 000	60 000	100%	18 000	30%
280 000		**280 000**	**70 640**		**71 484**	

REQUIRED

a) Identify which method of inventory valuation was used by the management accountant to prepare the quantity statement above. Motivate your answer.
b) Calculate the percentage of completion of opening WIP as at 1 February 20X1.
c) Prepare the following for February 20X1 if wastage now occurs at the end of the process. Also assume that the company uses the weighted average method of inventory valuation.
   a. Quantity statement
   b. Production cost statement
   c. Allocation statement
d) Explain the effect on the normal loss calculation and the remainder of the quantity statement in (c) if the percentage of completion (opening WIP) changes to 80% and the FIFO method of inventory valuation is applied.

Revision Exercise 6.5

White Tooth (Pty) Ltd manufactures one type of toothpaste in a single process and uses a process costing system. The following information is available for June 20X1.

	Units
Work-in-process:	
1 June 20X1 – 30% completed	80 000
30 June 20X1 – 60% completed	70 000
Put into production in June	260 000
Completed and transferred in June	240 000

Additional information:

- The company uses the weighted average method of inventory valuation.
- Raw materials are added at the beginning of the process and conversion takes place evenly throughout the process.
- Normal losses are estimated as 4% of units that reach the wastage point. Wastage occurs when the process is 50% complete.
- Cost information for June 20X1 was as follows:

	Material	**Conversion**
	R	**R**
Work in process (1 June 20X1)	760 000	1 010 000
Current production cost	2 890 000	3 250 000

REQUIRED

Prepare the quantity statement.
Prepare the production cost statement.
Prepare the cost allocation statement.

Revision Exercise 6.6

Yogi Drink (Pty) Ltd produces drinking yoghurt in a single process and uses a process costing system. The following information is available for June 20X1.

	Units
Work-in-process:	
1 June 20X1 – 60% completed	40 000
30 June 20X1 – 80% completed	30 000
Put into production in June	120 000
Completed and transferred in June	90 000

Additional information:

- The company uses the FIFO method of inventory valuation.
- Raw materials are added at the beginning of the process and conversion takes place evenly throughout the process.
- Normal losses are estimated as 15% of units that reach the wastage point. Wastage occurs when the process is 40% complete.
- Cost information for June 20X1 was as follows:

	Material	**Conversion**
	R	**R**
Work in process (1 June 20X1)	340 000	530 000
Current production cost	760 000	890 000

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REQUIRED

Prepare the quantity statement.
Prepare the production cost statement.
Prepare the cost allocation statement.

Revision Exercise 6.7

The following details relate to the main process of W Limited, a chemical manufacturer:

Opening work-in-progress	2 000 litres, 40% complete
Material input	24 000 litres
Normal losses are 10% of input and are detected at the end of the process	
Output to process 2	19 500 litres
Closing work-in-progress	3 000 litres, 45% complete

The following costs were incurred:

	Raw material **R**	**Conversion costs** **R**
Opening work-in-progress	120 600	230 800
Current production	800 420	1 056 200

Raw materials are added at the beginning of the process, conversion takes place evenly throughout the process.

The company uses the FIFO method of inventory valuation.

REQUIRED:

a) Prepare the following:
- Quantity statement
- Production cost statement
- Allocation statement

b) Prepare the following, if the company now uses the weighted average method of inventory valuation and that losses occur at 30% through the process:
- Quantity statement
- Production cost statement
- Allocation statement

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[Drury Adapted]

Revision Exercise 6.8

A company operates several production processes involving the mixing of ingredients to produce animal feedstuffs. One such product is mixed in two separate process operations. The information below is of the costs incurred in, and output from, Process 2 during the period just completed.

Costs incurred	**R**
Opening work-in-progress raw materials costs	15 476
Opening work-in-progress conversion costs	11 564
Current period raw materials costs	470 972
Current period conversion costs	638 176

Production	**Units**
Opening work-in-progress (50% complete)	1 200
Transfers from Process 1	112 000
Completed output	105 400
Closing work-in-progress (75% complete)	1 600

Raw materials are added at the beginning of the process, conversion takes place evenly throughout the process.

Normal wastage occurs at 10% of the process and is expected to be 5% of input.

The company uses the FIFO method of inventory valuation.

REQUIRED:

Prepare the following:

- Quantity statement
- Production cost statement
- Allocation statement

Prepare the following, if the company now uses the weighted average method of inventory valuation and that losses occur at 60% through the process:

- Quantity statement
- Production cost statement
- Allocation statement

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Learning Unit 7: Joint products and By-products costing systems

Learning Objectives:

- Differentiate between joint and by-products.
- Allocate joint costs, using different methods.
- Calculate profits from the sale of joint products.
- Calculate the value of joint and by-product inventory.
- Account for by-products

Material used for this learning unit:

- Chapter 8 of the prescribed textbook

Prescribed material used for this learning unit:

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

Study the following subsections in chapter 8:

- Joint products and by-products
- Methods of allocating joint costs
- Accounting for by-products

My notes

Introduction

A joint process is a process where raw material is processed to a point where more than one product is generated. These products will not be separately identifiable until the joint process is complete. The point reached where these products are then separately identifiable is called the split-off point. The costs incurred in the joint process are called joint costs and will include raw materials, labour and manufacturing overheads.

You have the option to sell the products at this point, providing they have a market value at split-off point. Or else further processing costs can be in incurred on each individual product to obtain a final more advanced product which is then sold.

The products generated at split-off point can either be joint products or by-products. Joint products are the products which have a significant sales value. By-products are products that are generated due to the nature of the process and will be incidental to the production process. The sales value of these products is insignificant, and, in some cases, there will not be a sales value at all. In the case of a by-product not having a sales value, these will be regarded as waste or scrap products and will need to be disposed of.

We will be looking at what is included in joint costs. Thereafter we will look at 4 different methods that can be used to allocate joint costs to the products that have been generated at the split-off point during the joint process. These methods are the physical standard methods, sales value at split-off point, the net realisable value methods and the gross profit percentage method.

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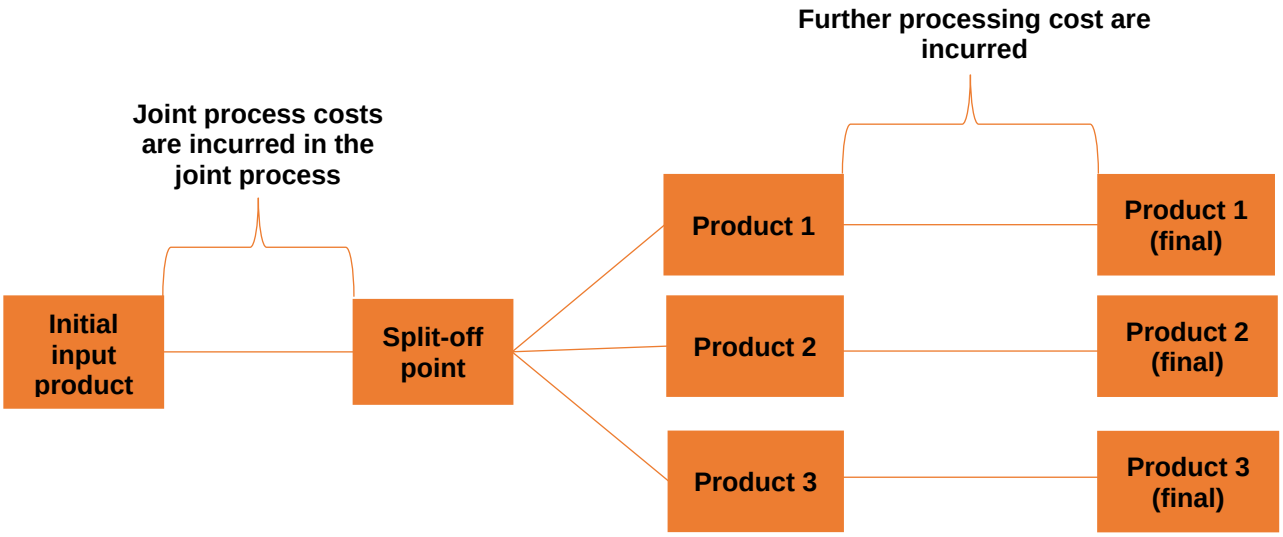
After this we will look at how to account for by-products depending on the nature of the by-product generated in the context of the nature of the business.

The below figure is an illustration of what the process would look like from the initial input of the product through to the final product after further processing:



Methods for allocating joint costs

Physical measures method

With this method joint costs are allocated based on the physical units of output (units produced), for example litres, kilograms, etc. This method will only be appropriate when output units are very similar in nature and value.

Sales value at split-off point method

This method (also called the market value at split-off point method) allocates joint costs by taking into consideration the sales value of units of output at the split-off point. The total sales value of products generated will be used as ratio to allocate joint costs. We assume that more costs should be allocated to products with a higher sales value.

We can only use this method if products can be sold at split-off point, i.e. they have a market value.

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Net realisable value (NRV) at split-off point method

The NRV at split of point allocates joint costs based on the total net realisable value of products at split-off point. The NRV of a product is calculated by using the final sales value per product after further processing and deducting the further processing cost per product from the final sales value. This NRV per product then needs to be multiplied by the total number of output units to get to the total NRV for that product. This is done for each product and then the total NRV of all products is used as the ratio in which joint costs are allocated.

Constant gross profit percentage method

This method is also called the reversal cost method. Here we want to arrive at a gross profit per product line and therefore need to calculate what the joint cost is that needs to be absorbed by that product line in order to arrive at the gross profit required. You will note in the illustrative example below that you will have to work backwards to calculate what the joint cost is that needs to be absorbed by the product line.

Illustrative example 1

R&M Butchers has provided you with the following information:

When carcasses are processed, three separate joint products are obtained, grade A meat, grade B meat and grade C meat.

Potential selling prices per kilogram of the products **at split-off point** immediately after separation are:

Grade A	R 60
Grade B	R 40
Grade C	R 30

During the month, 120 carcasses are processed at a joint cost of R 1 680 000. The processing of the carcasses in the joint process yielded 38 000 kg of grade A meat, 32 000 kg of grade B meat and 26 000 kg of grade C meat.

All joint products undergo further processing before they are sold as finished products. Grade A meat is converted into fillet steak, grade B meat is converted into mince and grade C meat is converted into brisket.

The selling price per kilogram of joint products **after further processing** is:

Steak	R 90
Mince	R 60
Brisket	R 50

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Additional costs per kilogram of further processing of joint products after the split-off point are:

Grade A (steak)	R 22
Grade B (mince)	R 15
Grade C (brisket)	R 12

The target GP% for steak and mince are 55%. There was no opening inventory and the total production for the month was sold. Sales and distribution costs for the month are:

Grade A (steak)	R 30 000
Grade B (mince)	R 20 000
Grade C (brisket)	R 16 000

REQUIRED

Draft a statement of comprehensive income, showing the gross profit and gross profit percentage if the joint cost is allocated according to the following methods:

a) The physical measures method
b) The sales value at split-off point method if:
a. All products are sold at the split-off point
b. All products undergo further processing
c) NRV at split-off point method
d) Constant gross profit percentage method

Assume in all cases further processing takes place, except in b) a.

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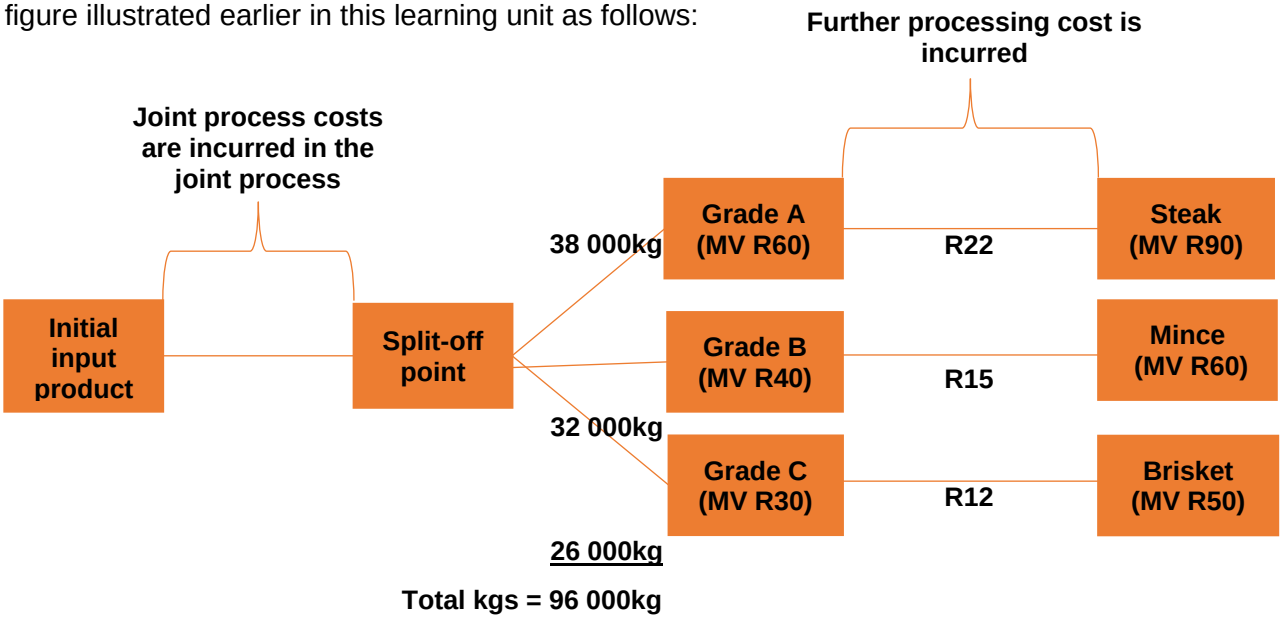
Solution to Illustrative example 1

The easiest way to process all the above information is to draw a quick figure like the figure illustrated earlier in this learning unit as follows:



a)

Product	Quantity produced (kilograms)	Calculation	Joint cost allocated R	Cost per kg R
Grade A	38 000	38 000 / 96 000 x R1 680 000	665 000	17.50
Grade B	32 000	32 000 / 96 000 x R1 680 000	560 000	17.50
Grade C	26 000	26 000 / 96 000 x R1 680 000	455 000	17.50
Total	**96 000**		**1 680 000**	

Statement of comprehensive income

	Steak R	Mince R	Brisket R	Total R
Sales (38 000 kg x R90) (32 000 kg x R60) (26 000 kg x R50)	3 420 000	1 920 000	1 300 000	6 640 000
Less: Cost of sales	1 501 000	1 040 000	767 000	3 308 000
Joint costs	665 000	560 000	455 000	1 680 000
Additional costs (38 000 kg x R22) (32 000 kg x R15) (26 000 kg x R12)	836 000	480 000	312 000	1 628 000
Gross profit	**1 919 000**	**880 000**	**533 000**	**3 332 000**
Selling & Distribution	30 000	20 000	16 000	66 000
Net profit	**1 889 000**	**860 000**	**517 000**	**3 266 000**

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Gross profit %	**56%**	**46%**	**41%**

b)

Product	Market value	Calculation	Joint cost allocated R	Cost per kg R
Grade A	38 000 kg x R60 = R2 280 000	2 280'/4 340' x R1 680 000	882 581	27.58
Grade B	32 000 kg x R40 = R 1 280 000	1 280'/4 340' x R1 680 000	495 484	15.48
Grade C	26 000 kg x R30 = R 780 000	780'/4 340' x R1 680 000	301 935	11.61
Total	**4 340 000**		**1 680 000**	

a.

Statement of comprehensive income

	Steak R	Mince R	Brisket R	Total R
Sales (38 000 kg x R60) (32 000 kg x R40) (26 000 kg x R30)	2 280 000	1 280 000	780 000	4 340 000
Less: Joint costs	882 581	495 484	301 935	1 680 000
Gross profit	**1 397 419**	**784 516**	**478 065**	**2 660 000**
Selling & Distribution	30 000	20 000	16 000	66 000
Net profit	**1 367 419**	**764 516**	**462 065**	**2 594 000**
Gross profit %	**61%**	**61%**	**61%**	

b.

Statement of comprehensive income

	Steak R	Mince R	Brisket R	Total R
Sales (38 000 kg x R90) (32 000 kg x R60) (26 000 kg x R50)	3 420 000	1 920 000	1 300 000	6 640 000
Less: Cost of sales	1 718 581	975 484	613 935	3 308 000
Joint costs	882 581	495 484	301 935	1 680 000
Additional costs (38 000 kg x R22) (32 000 kg x R15) (26 000 kg x R12)	836 000	480 000	312 000	1 628 000
Gross profit	**1 701 419**	**944 516**	**686 065**	**3 332 000**
Selling & Distribution	30 000	20 000	16 000	66 000

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Net profit	**1 671 419**	**924 516**	**670 065**	**3 266 000**
Gross profit %	**50%**	**49%**	**53%**	

c)

	Steak R	Mince R	Brisket R	Total R
Sales value (from a)	3 420 000	1 920 000	1 300 000	6 640 000
Less: Selling & Distribution	30 000	20 000	16 000	66 000
Less: Further processing costs (from a)	836 000	480 000	312 000	1 628 000
NRV at split-off	**2 554 000**	**1 420 000**	**972 000**	**4 946 000**

Product	NRV	Calculation	Joint cost allocated R	Cost per kg R
Grade A	2 554 000	2 554'/4 946' x R1 680 000	867 513	22.83
Grade B	1 420 000	1 420'/4 946' x R1 680 000	482 329	15.07
Grade C	972 000	972'/4 946' x R1 680 000	330 158	12.70
Total	**4 946 000**		**1 680 000**	

Statement of comprehensive income

	Steak R	Mince R	Brisket R	Total R
Sales (38 000 kg x R90) (32 000 kg x R60) (26 000 kg x R50)	3 420 000	1 920 000	1 300 000	6 640 000
Less: Cost of sales	1 703 513	962 329	642 158	3 308 000
Joint costs	867 513	482 329	330 158	1 680 000
Additional costs (38 000 kg x R22) (32 000 kg x R15) (26 000 kg x R12)	836 000	480 000	312 000	1 628 000
Gross profit	**1 716 487**	**957 671**	**657 842**	**3 332 000**
Selling & Distribution	30 000	20 000	16 000	66 000
Net profit	**1 686 487**	**937 671**	**641 842**	**3 266 000**
Gross profit %	**50%**	**50%**	**51%**	

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	Steak R	Mince R
Sales (from a)	3 420 000	1 920 000
Less: Gross profit required (55%)	1 881 000	1 056 000
Cost of sales	1 539 000	864 000
Less: Additional costs (from a)	836 000	480 000
Joint cost absorbed	703 000	384 000

Joint costs allocated to product Brisket will be the balance of the R 1 680 000, therefore R1 680 000 – R 703 000 – R 384 000 = R 593 000.

Statement of comprehensive income

	Steak R	Mince R	Brisket R	Total R
Sales (38 000 kg x R90) (32 000 kg x R60) (26 000 kg x R50)	3 420 000	1 920 000	1 300 000	6 640 000
Less: Cost of sales	1 539 000	864 000	905 000	3 308 000
Joint costs	703 000	384 000	593 000	1 680 000
Additional costs (38 000 kg x R22) (32 000 kg x R15) (26 000 kg x R12)	836 000	480 000	312 000	1 628 000
Gross profit	**1 881 000**	**1 056 000**	**395 000**	**3 332 000**
Selling & Distribution	30 000	20 000	16 000	66 000
Net profit	**1 851 000**	**1 036 000**	**379 000**	**3 266 000**
Gross profit %	**55%**	**55%**	**30%**	

Accounting for by-products

When accounting for by-products you need to first establish whether a regular market exists for the product.

By-products with a regular market

If a regular market exists for the by-product the joint costs to be allocated to joint products will be reduced by the NRV of the by-product, therefore crediting the joint costs with the NRV of the by-product. This will occur irrespective of whether the products have been sold in the accounting period.

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Illustrative example 2

Joint & By (Pty) Ltd operates a manufacturing process that produces joint products X and Y and by-product Z. Joint costs of the manufacturing process are R 400 000. The following output was generated:

Product X	20 000kg
Product Y	18 000kg
Product Z	2 000kg

By-product Z requires further processing at a cost of R2 per kg, after which it can be sold at R10 per kg.

Accounting entries for the by-product will be as follows:

Dr By-product inventory (2 000kg x (R10 – R2)	16 000	
Cr Joint process WIP account		16 000
Joint costs to be reduced by NRV of by-products		
Dr Cash/Debtors (2 000kg x R10)	20 000	
Cr By-product inventory		20 000
By-product sales for the period		
Dr By-product inventory (2 000kg x R2)	4 000	
Cr Cash/Creditors		4 000
Further processing costs incurred		

By-products with no regular market

When there is no regular market for a by-product it means that they need to be disposed of. There are two scenarios: There might be incidental sales of the by-product or disposal costs will have to be incurred to dispose of the by-product.

Incidental sales

No regular market exists for the by-product, but there might be incidental sales. In this case you have three options for accounting treatment:

1. Account for it as part of revenue
2. Reduce the cost of sales of joint products
3. Recognise it as other income

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Disposal costs incurred

If you incur disposal costs to dispose of the by-product the accounting treatment will be to increase the joint costs to be allocated to products. Therefore, debiting the joint costs.

Illustrative example 3

Refer to the information in Illustrative example 1. The following **additional information** is provided:

When the carcasses are processed, three separate joint products are produced: grade A meat, which is further processed into steak, grade B meat which is further processed into mince and grade C meat which is further processed into brisket. The bones yielded from the process represent a by-product, each carcass yielding 280 kg of bones. The selling price of the bones at the **split-off point** amounts to R6 per kilogram.

During the month, 120 carcasses are processed at a joint cost of R 1 680 000. The processing of the carcasses in the joint process yielded 38 000 kg of grade A meat, 32 000 kg of grade B meat and 26 000 kg of grade C meat.

All joint products were processed further before being sold as finished products. However, further processing is only initiated once an order is received for the finished product. The sales of finished products for the month were:

Steak	36 000 kg
Mince	29 000 kg
Brisket	25 000 kg

There was no opening inventory and the total production of final products for the month was sold.

32 500 kg bones were sold this month.

Other relevant cost information is as provided in Illustrative example 1.

Company policy regarding by-products is that joint process costs are allocated based on the physical measures method.

REQUIRED

Draft the statement of comprehensive income for the month, assuming each of the following assumptions for the by-product (each case is independent):

a) A regular market exists for the by-product.

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b) No regular market exists for the by-product and proceeds are regarded as 'other income', directly in the statement of comprehensive income.

c) No regular market exists for the by-product and proceeds are regarded as 'a reduction of cost of sales', directly in the statement of comprehensive income.

Solution to Illustrative example 3

a)

Statement of comprehensive income

Sales - Joint products (1)	6 230 000
Less: Cost of sales	2 906 400
Joint costs	1 680 000
Less: Proceeds from by-products (2)	(201 600)
	1 478 400
Less: Closing inventory joint products (3)	(99 000)
Plus: Further processing costs (4)	1 527 000
Gross profit	**3 323 600**
Less: Sales and distribution costs	(66 000)
Net profit	**3 257 600**

Calculations:

Calculation 1

(R90 x 36 000kg) + (R60 x 29 000kg) + (R50 x 25 000kg)	6 230 000

Calculation 2

Sales value of bones (280kg x 120 x R6)	201 600
Less: Further processing costs	-
NRV of bones	201 600

Based on production, NOT sales

Calculation 3

Allocation of joint costs:

Grade A (R 1 478 400 x 38 000 / (38 000 + 32 000 + 26 000)	585 200
Grade B (R 1 478 400 x 32 000 / (38 000 + 32 000 + 26 000)	492 800
Grade C (R 1 478 400 x 26 000 / (38 000 + 32 000 + 26 000)	400 400

Value of closing inventory:

Grade A (R 585 200 x (38 000kg - 36 000kg) / 38 000kg	30 800
Grade B (R 492 800 x (32 000kg - 29 000kg) / 32 000kg	46 200
Grade C (R 400 400 x (26 000kg - 25 000kg) / 26 000kg	15 400
	92 400

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Bones at NRV ((280kg x 120) - 32 500kg) x R6)	6 600
Total inventory on hand	99 000

Calculation 4

(R22 x 36 000kg) + (R15 x 29 000kg) + (R12 x 25 000kg)	1 527 000

b)

Statement of comprehensive income

Sales - Joint products (from a)	6 230 000
Less: Cost of sales	3 102 000
Joint costs	1 680 000
Less: Closing inventory joint products (1)	(105 000)
Plus: Further processing costs (from a)	1 527 000
Gross profit	**3 128 000**
Less: Sales and distribution costs	(66 000)
Net profit	**3 062 000**
Plus: Income from by-products (2)	195 000
Net operating profit	**3 257 000**

Calculations

Calculation 1

The physical standard method is used; therefore, each unit has the same cost:

R 1 680 000 / (38 000kg + 32 000kg + 26 000kg) x 6000kg	105 000

Calculation 2

32 500kg x R6	195 000

c)

Statement of comprehensive income

Sales - Joint products (from a)	6 230 000
Less: Cost of sales	2 907 000
Joint costs	1 680 000
Less: Proceeds from by-products (from b)	(195 000)
Less: Closing inventory joint products (from b)	(105 000)
Plus: Further processing costs (from a)	1 527 000
Gross profit	**3 323 000**
Less: Sales and distribution costs	(66 000)
Net profit	**3 257 000**

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Revision Exercises

Revision Exercise 7.1

Caffeine Pro (Pty) Ltd is the parent company of three subsidiary companies: Harvest Pro (Pty) Ltd, Roasting Pro (Pty) Ltd and Bean Pro (Pty) Ltd. The company operates in the coffee industry and has a holistic view on business.

Harvest Pro (Pty) Ltd consists of multiple farms with coffee plantations and the nature of the business is the harvesting of coffee beans. The company only harvests three grades of coffee beans as graded by the SCAA (Specialty Coffee Association of America), namely Specialty Grade Green Coffee (Grade 1), Premium Coffee Grade (Grade 2) and Exchange Coffee Grade (Grade 3). The company uses a joint- and by-product costing system.

During the process of harvesting coffee beans, approximately 50% of the coffee fruit is discarded in the form of pulp and mucilage. To prevent water pollution, the pulp and mucilage must be disposed of. It is estimated that it will cost the company R 260 000 in the 2019 financial year to dispose of the pulp and mucilage. There is currently no other use for these products.

The following is an estimate of the cost to be incurred for the 2019 financial year regarding the harvesting of coffee:

Direct material R 1 020 000
Direct labour R 840 000
Transportation R 370 000
Manufacturing overheads R 680 000

At the split-off point, one tonne of coffee fruit generates 250kg of grade 1 coffee, 150kg of grade 2 coffee and 100kg of grade 3 coffee. At this point grade 1 coffee is sold for R120 per kilogram, grade 2 coffee is sold for R80 per kilogram and grade 3 coffee is sold for R50 per kilogram.

No further processing is done. Assume that the company had no opening or closing inventory.

REQUIRED:

1. Determine the joint costs for the 2019 financial year to be allocated.
2. Allocate the joint costs to the products based on the sales value at split-off point method.
3. Discuss the accounting treatment for a by-product with incidental sales if no regular market exists.
   [Round all answers to the nearest Rand.]

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Revision Exercise 7.2

WoodWorx (Pty) Ltd processes wood which is then sold to companies that manufacture wooden furniture. The company uses a joint- and by-product costing system. A log is typically added into the process to generate various sizes of wood that can be used in the manufacturing of different products. At split-off point, one log generates 6m² of wood used in tables and 4m² of wood used in chairs. Approximately 300mm² of a log can be regarded as either saw dust or off-cuts. There is, however, a regular market for this. Bird farmers regularly purchase saw dust and off-cuts and they are willing to pay R50 for the saw dust and cut-offs per log. No further processing is needed for these by-products.

Total joint costs to be allocated are estimated to be R3 000 per log.

600 logs are budgeted to be processed during the 2019 financial year. Further processing costs are incurred after which products are then sold. The following information is available:

Product	**Further processing costs per m²**	**Selling price per m² after further processing**
Table wood	R80	R810
Chair wood	R60	R440

REQUIRED:

Draft a Statement of Comprehensive Income, showing the gross profit and gross profit margin, if the joint cost is allocated according to the net realisable value method.

Revision Exercise 7.3

Attempt Q6.16 (a-b) in Drury textbook, 11th Edition.

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Learning Unit 8: Direct and Absorption costing

Learning Objectives:

- Identify the differences between direct and absorption costing methods
- Draft the statement of comprehensive income according to the absorption costing method using different inventory valuation methods
- Draft the statement of comprehensive income according to the direct costing method using different inventory valuation methods
- Reconcile the differences in profit between the two costing methods
- Identify the most appropriate method given specific circumstances

My notes

Material used for this learning unit:

- Chapter 7 of the prescribed textbook

Prescribed material used for this learning unit:

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

Study the following subsections in chapter 7:

- External and internal reporting
- Variable costing
- Absorption costing
- Some arguments in support of variable costing
- Some arguments in support of absorption costing

Introduction

Until now we have looked at methods to determine product costs for purposes of inventory valuation in terms of external reporting (IFRS). This involved allocating all production costs to inventory and cost of sales and treating non-manufacturing costs as a period cost. Preparing a statement of comprehensive income on these principles is called an absorption costing system.

In this learning unit we will look at another costing system namely the direct costing system (also called a variable costing system or a marginal costing system). This system is used for internal reporting and analysis purposes and here we will allocate only variable manufacturing costs to product costs for inventory valuation purposes and fixed manufacturing costs will be treated as a period cost.

It is important to note the difference between the two methods and the uses of the methods respectively.

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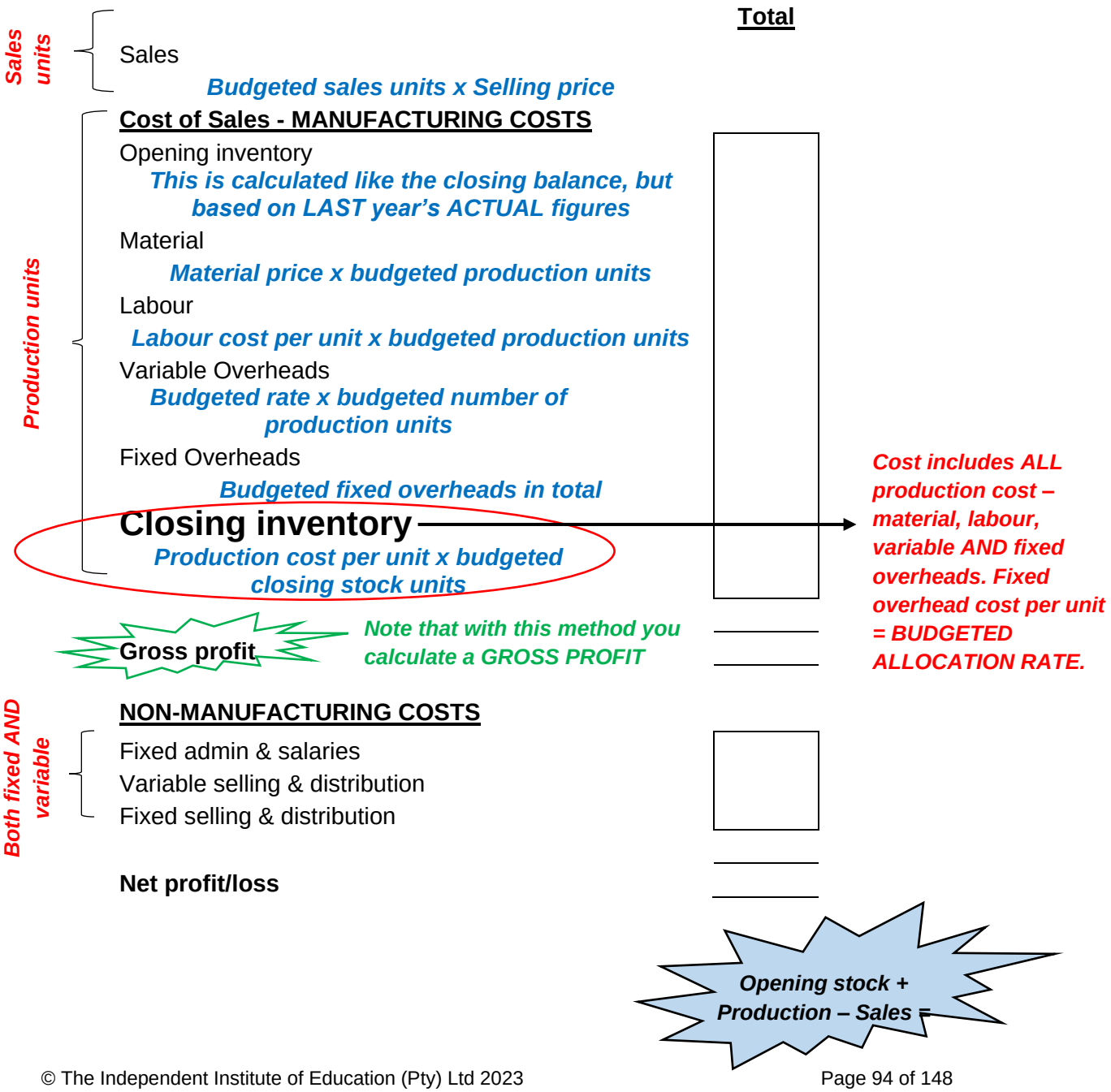
For purposes of this module we will only deal with budgeted statements of direct and absorption costing. The actual statements of direct and absorption costing will be dealt with in MFAC7311.

Absorption costing versus Direct costing

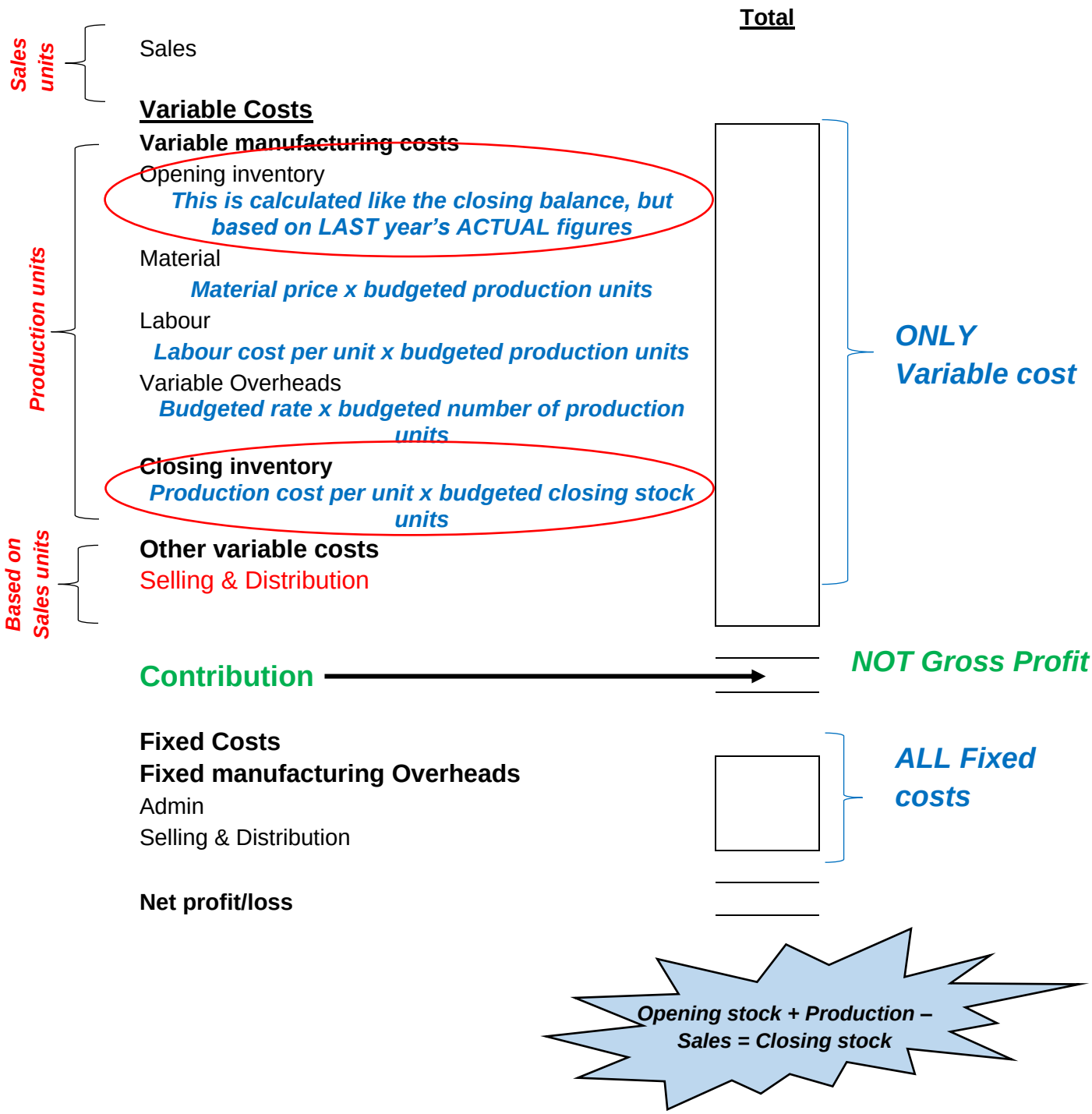
Absorption costing

The following format should be used to prepare an absorption costing statement. Note that this is similar to the statement of comprehensive income that you would prepare in financial accounting:


Total
Sales units
Sales
Budgeted sales units x Selling price
Cost of Sales - MANUFACTURING COSTS
Opening inventory
This is calculated like the closing balance, but based on LAST year's ACTUAL figures
Material
Material price x budgeted production units
Labour
Labour cost per unit x budgeted production units
Variable Overheads
Budgeted rate x budgeted number of production units
Fixed Overheads
Budgeted fixed overheads in total
Production units
Closing inventory
Production cost per unit x budgeted closing stock units
Cost includes ALL production cost – material, labour, variable AND fixed overheads. Fixed overhead cost per unit = BUDGETED ALLOCATION RATE.
Gross profit
Note that with this method you calculate a GROSS PROFIT
NON-MANUFACTURING COSTS
Both fixed AND variable
Fixed admin & salaries
Variable selling & distribution
Fixed selling & distribution
Net profit/loss
Opening stock + Production – Sales =

Direct costing

The following format should be used to prepare a direct costing statement. Note that with this statement we distinguish between variable and fixed costs:



FIFO versus weighted average method of inventory valuation

You will remember that in learning unit 5 we dealt with inventory valuation methods. We will apply the FIFO method and weighted average method of inventory valuation to direct and absorption costing as well. The only line items in your statements that will be affected will be opening and closing inventory. Everything else will remain the same for both methods.

FIFO method of inventory valuation

If you can recall, with the FIFO method we sell the oldest inventory first. Only once the oldest inventory has all been sold do we move on to the second oldest and so on and so forth. How does this affect the statements? Opening inventory will be valued at the **unit cost** of inventory for the **prior** year and closing inventory will be valued at the **current year unit cost** of inventory for the **current** year. This is the latest available cost of inventory for the respective years. This unit cost will then be multiplied with the number of units in inventory to get to the **value** of opening and closing inventory to be included in your statements.

Weighted average method of inventory valuation

With the weighted average method, you need to calculate the weighted average price per unit of inventory for the year as you learned in learning unit 5. For the opening inventory it will be based on the **prior** year figures and for the closing inventory it will be based on the **current** year figures. This is done by adding the cost for opening inventory and units produced during the year together and dividing this by the total of the units for opening inventory and current production (total units available for sale during the current year).

You can use the following table for your calculation:

	Total units	**Total cost**
Opening inventory		
Current year production		
Total		

Current year production cost includes ALL production cost – material, labour, overheads. Note that for direct costing it will only include variable costs whereas for absorption costing it will also include fixed overheads.

Weighted average cost per unit = Total cost / Total units

Activity 8.1

Tshabalala Co (Pty) Ltd manufactures and sells porcelain dolls. The selling price per doll for 20X0 was R200 per doll and is expected to increase with 15% per year from 20X1. There was no opening inventory at the beginning of 20X0.

You have been supplied with the following further information regarding unit movements:

Year	Manufactured	Sold	Closing inventory
20X0 (Actual)	1 100 units	1 000 units	?
20X1 (Budget)	1 300 units	1 200 units	?

Margie Tshabalala, the Chief Financial Officer of Tshabalala Co (Pty) Ltd, presented you with the following cost information. The company's financial year end is 30 November:

	R 20X0	R 20X1
Variable cost per unit:		
Direct material	20,00	25,00
Direct labour	6,00	7,00
Variable manufacturing overheads	5,00	5,50
Variable selling costs	1,50	1,60
Fixed costs in total:		
Fixed manufacturing overheads	12 000,00	14 000,00
Fixed selling costs	21 000,00	23 000,00
Fixed administrative overheads	9 000,00	11 500,00

REQUIRED

Prepare the budgeted statement of comprehensive income for the year ended 30 November 20X1 according to:

a) The direct costing method, assuming the company uses the FIFO method of inventory valuation.
b) The direct costing method, assuming the company uses the weighted average method of inventory valuation.
c) The absorption costing method, assuming the company uses the FIFO method of inventory valuation.
d) The absorption costing method, assuming the company uses the weighted average method of inventory valuation.

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Reconciling differences between net profit

You will note that in Activity 8.1 above, there is a difference in net profit between the direct costing method and absorption costing method even though the statement was prepared based on the same information given. The reason for this is opening and closing inventory. With direct costing, opening and closing inventory is valued on variable cost only, whilst with absorption costing, fixed manufacturing costs are also included in opening and closing inventory. You can reconcile the difference in net profits by using the following format:

Net profit according to:
- Direct costing method
- Absorption costing method
- Difference

Opening inventory according to:
- Direct costing method
- Absorption costing method
- Difference

Closing inventory according to:
- Direct costing method
- Absorption costing method
- Difference

Reconciliation in Rand value:
- Opening inventory difference
- Closing inventory difference
- Difference in profits

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Revision Exercises

Revision Exercise 8.1

The management accountant has presented the following information for Lavida (Pty) Ltd, which manufactured a single product type for the year ended 31 October 20X1.

Prime cost per unit	R130 (20X0: R110)
Selling price per unit	R210 (20X0: R190)

Overhead Costs:

• Manufacturing (variable)	R50 per unit
• Manufacturing (fixed)	R 160 000
• Selling and administrative (fixed)	R 90 000
• Selling and administrative (variable)	R2,50 per unit

Additional information:

- Lavida (Pty) Ltd manufactures 20 000 units per year.
- Units sold during 20X1 were 15 000.
- The cost structure, except for prime costs, for 20X1 remained unchanged from 20X0.
- Opening inventory value for 2 500 units calculated for IFRS purposes at 1 November 20X0 is R 420 000.
- There was no opening inventory at the beginning of the previous financial year.
- Lavida (Pty) Ltd applies the weighted average method of inventory valuation.

REQUIRED:

a) Draft the contribution statement of comprehensive income for the year ended 31 October 20X1 using the direct costing method.
b) Draft the contribution statement of comprehensive income for the year ended 31 October 20X1 using the absorption costing method.
c) Reconcile the difference in profits according to the two methods.

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Revision Exercise 8.2

The following information was extracted from the accounting records of FIFA Limited for the year ended 31 December 20X0 and their 20X1 budget:

	Actual 20X0	Budget 20X1
Units:		
Completed units at the beginning of the year	Nil	5 000
Production for the year	30 000	32 000
Sales for the year	25 000	35 500
Costs:	**R**	**R**
Fixed costs:		
Production	135 000	153 250
Selling and administrative	80 000	80 000
Variable cost per unit:		
Production	10,15	12,00
Selling and administrative	4,00	4,00
Selling price per unit	28,00	25,00

Additional information:

The company uses the FIFO method of inventory valuation.

REQUIRED

a) Draft the contribution statement of comprehensive income for the year ended 31 December 20X1 using the direct costing method.
b) Draft the contribution statement of comprehensive income for the year ended 31 December 20X1 using the absorption costing method.
c) Reconcile the difference in profits according to the two methods.

Revision Exercise 8.3

Cute Cars (Pty) Ltd manufactures and sells toy cars. The selling price per car for 20X0 was R50 and is expected to increase with 10% per year from 20X1. There were 2500 units in opening inventory at the beginning of 20X0.
You have been supplied with the following further information regarding unit movements:

Year	Manufactured	Sold	Closing inventory
20X0 (Actual)	24 000 units	23 500 units	?
20X1 (Budget)	23 000 units	25 000 units	?

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The accountant presented you with the following cost information. The company's financial year end is 30 April:

Actual information for 20X0:

	R
Manufacturing costs:	
Direct material cost per unit	10.00
Direct labour cost per unit	3.00
Variable manufacturing overhead cost per unit	2.50
Fixed manufacturing overhead costs in total	80 000.00
Non-manufacturing costs:	
Selling and distribution costs in total	19 750.00
Fixed administrative overheads in total	5 000.00

Additional information relating to 20X1:

- Direct material cost per unit is expected to increase with 10%.
- The current labour force is on strike and demands an increase of 11%. The accountant expects the increase to remain at the planned 7%.
- Variable manufacturing overhead costs are expected to remain unchanged.
- The fixed manufacturing costs for 20X0 includes monthly factory rental of R3 000 which is due for annual escalation of 6% on 1 May each year.
- Selling and distribution costs include both fixed and variable costs. Total selling and distribution costs for 20X1 are budgeted to be R20 500.
- Fixed administrative overheads are expected to increase by 6%.
- You can assume that the cost of opening inventory for 20X0 was in line with 20X0 production costs.

REQUIRED

Prepare the budgeted statement of comprehensive income for the year ended 30 April 20X1 according to:

1. The direct costing method, assuming the company uses the FIFO method of inventory valuation.
2. The direct costing method, assuming the company uses the weighted average method of inventory valuation.
3. The absorption costing method, assuming the company uses the FIFO method of inventory valuation.
4. The absorption costing method, assuming the company uses the weighted average method of inventory valuation.

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Revision Exercise 8.4

Magnificent Fans (Pty) Ltd manufactures and sells domestic fans. The selling price per fan for 20X0 was R760. Due to the economic downturn the selling price is expected to decrease with 5% in 20X1 since the company would like to try and maintain good sales quantities. There were 3 560 fans in opening inventory at the beginning of 20X0.

You have been supplied with the following further information regarding unit movements:

Year	Manufactured	Sold	Closing inventory
20X0 (Actual)	46 250 units	45 360 units	?
20X1 (Budget)	45 200 units	44 500 units	?

The accountant presented you with the following cost information. The company's financial year end is 30 June:

Actual information for 20X0:

	R
Manufacturing costs:	
Direct material cost per unit	160.00
Direct labour cost per unit	42.00
Variable manufacturing overhead cost per unit	22.50
Fixed manufacturing overhead costs in total	250 800.00
Non-manufacturing costs:	
Variable selling and distribution costs per unit	5% of the selling price
Fixed selling and distribution costs	55 600.00
Fixed administrative overheads in total	68 000.00

Additional information relating to 20X1:

- Direct material cost per unit is expected to increase with 12%.
- The direct labour rate per hour will increase with 3%. The company has done an analysis on the time taken per unit and expects the employee morale to be affected due to the low increase. They estimate that it will take 5% longer to manufacture a fan.
- Variable manufacturing overhead costs are expected to increase in line with the time taken per unit manufactured.
- The fixed manufacturing costs for 20X0 includes depreciation of R5 000 per month of a machine that has been fully depreciated at the end of 20X0. The company is not planning to replace the machine in 20X1. Other fixed manufacturing overheads will increase with 5%.
- Fixed selling and distribution costs is expected to increase with 5%. Variable selling and distribution costs will increase to 7% of the selling price to ensure sales personnel maximize sales.

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- Fixed administrative overheads will remain unchanged.
- You can assume that the cost of opening inventory for 20X0 was in line with 20X0 production costs.

REQUIRED
Prepare the budgeted statement of comprehensive income for the year ended 30 June 20X1 according to:

1. The direct costing method, assuming the company uses the FIFO method of inventory valuation.
2. The direct costing method, assuming the company uses the weighted average method of inventory valuation.
3. The absorption costing method, assuming the company uses the FIFO method of inventory valuation.
4. The absorption costing method, assuming the company uses the weighted average method of inventory valuation.

Revision Exercise 8.5

Roast Co (Pty) Ltd roasts coffee beans and specialise in roasting one blend of coffee only. The company sell to coffee chains and package the beans in bags of 1 kilogram.

Currently the company reports on an absorption costing basis. The company experienced exponential growth in the past two years and is considering implementing a direct costing system for management accounting purposes.

You have extracted the following actual results for the year ended 30 April 2018:

Variable costs:	
Sales	125 000 bags
Sales revenue	R10 000 000
Direct material	R25 per kilogram
Packaging	R7 per bag
Direct labour	R15 per kilogram
Variable manufacturing overheads	R5 per kilogram
Selling and distribution costs	5% of the selling price

Fixed costs:

Fixed manufacturing overheads	R132 000
Administrative costs	R156 000
Selling and distribution	R 72 000

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The following budgeted information for the year ended 30 April 2019 was provided:

- The selling price will be increased with 10%. Due to the increase in selling price the sales volume is expected to decrease with 5%.
- All coffee beans are imported from Ethiopia. Due to the weakening of the Rand and continued drought in Africa the direct material is expected to increase with 20% per kilogram. There was no opening or closing inventory for coffee beans.
- The company has a contract with the packaging supplier. The contract ends on 31 October 2018 after which the packaging per bag will increase to R8 per unit. Sales and production take place evenly throughout the year.
- Direct labour is expected to increase with 7%.
- Variable manufacturing overheads and variable selling and distribution costs will remain the same as in the 2018 financial year.
- Fixed manufacturing costs will increase with 6%. This is in line with inflation.
- Due to restructuring, fixed non-manufacturing costs is expected to remain the same as in the 2018 financial year.

The following information regarding kilograms were extracted from the inventory system:

Details	**2018 (Actual)**	**2019 (Budgeted)**
Opening inventory (finished goods)	12 500 kg	?
Production (finished goods)	130 000 kg	115 000 kg

The value of opening inventory for the 2018 financial year was R625 000 based on the absorption costing basis. The company uses the weighted average method of inventory valuation. There was no opening or closing balances for work in progress.

REQUIRED
Prepare the budgeted statement of comprehensive income for the period ended 30 April 2019 based on the absorption costing method. [Round all answers to two decimal places.]

Revision Exercise 8.6

Magnificent Toys Ltd makes a toy called The Alternator 2017. The company was started in 2016. The selling price for The Alternator 2017 in the 2017 financial year is R540. The selling price is expected to increase next year (2018) with 10%. You have been provided with the following information regarding the toy:

Year	Manufactured	Sold	Closing inventory
2016	2 500 units	2 350 units	?

2017	2 760 units	2 800 units	?
2018	2 950 units	2 670 units	?

Tony Stark, the CFO, has provided you with the following information regarding the costs of the products:

	2017	**2018**
Variable costs per unit		
Direct Material	80	83
Direct Labour	60	65
Variable manufacturing overheads	25	28
Variable selling costs	35	42
Fixed costs in total		
Fixed manufacturing overheads	65 000	68 000
Fixed selling costs	15 000	17 000
Fixed administrative overheads	22 000	26 000

The company makes use of the weighted average method of inventory valuation. You can assume that the prior year weighted average cost per unit was R165 (variable manufacturing costs only), the fixed cost portion worked out to be R23.55 per unit.

There was no opening or closing stock for materials or work in progress.

REQUIRED

Prepare the budgeted statement of comprehensive income for the year ended 31 December 2018 according to the direct costing method.

Reconcile the difference in profits according to the two methods if the net profit from the absorption costing method is R900 378 and the weighted average cost per unit for the closing inventory is R198.67.

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Learning Unit 9: Budgeting techniques	
Learning Objectives: • Describe the stages in the budgeting process • Describe the sub-budgets included in the master budget • Prepare a cash budget • Prepare a flexible budget • Describe the advantages and disadvantages of budgeting	**My notes**
Material used for this learning unit: • Chapter 16 of the prescribed textbook	
Prescribed material used for this learning unit: Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM) **Study the following subsections in chapter 16:** ○ Stages in the budgeting process ○ The multiple functions of budgets ○ A detailed illustration ○ Criticisms of budgeting	

Introduction

A budget is an integral part of the strategic planning process. It is a short-term plan (12 months) that assists the company in attaining long term goals. The strategic planning, budgeting and control process can be illustrated as follows:

1. Strategic planning process (setting objectives and strategies)
2. Creating a long-term plan to implement strategies
3. Preparing the annual budget within the context of the long-term plan
4. Monitoring actual results
5. Responding to deviations from plan

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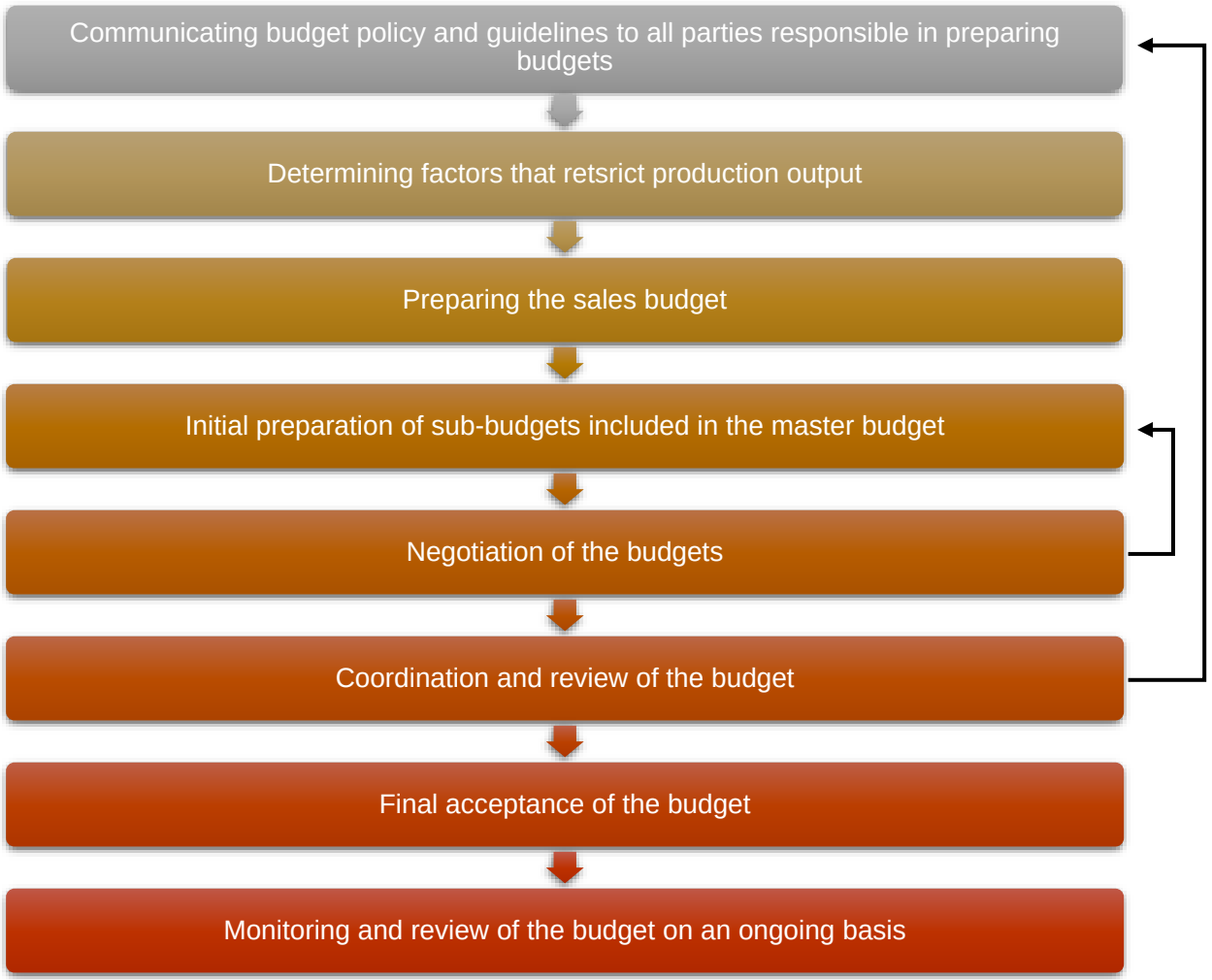
Budgets are set in monetary terms (Rand values), however, when compiling a budget, both quantitative and qualitative factors need to be taken into consideration. In this learning unit, we will focus on describing the stages of budgeting process and then describe the sub-budgets included in the master budget. We will conclude by looking at how to prepare a cash budget.

Stages in the budgeting process


Communicating budget policy and guidelines to all parties responsible in preparing budgets
Determining factors that retsrict production output
Preparing the sales budget
Initial preparation of sub-budgets included in the master budget
Negotiation of the budgets
Coordination and review of the budget
Final acceptance of the budget
Monitoring and review of the budget on an ongoing basis

The master budget

In the master budget all sub-budgets that have been prepared are consolidated and the budgeted statement of profit and loss and budgeted statement of financial position can now be drafted. The sub-budgets included in the master budget includes the following:

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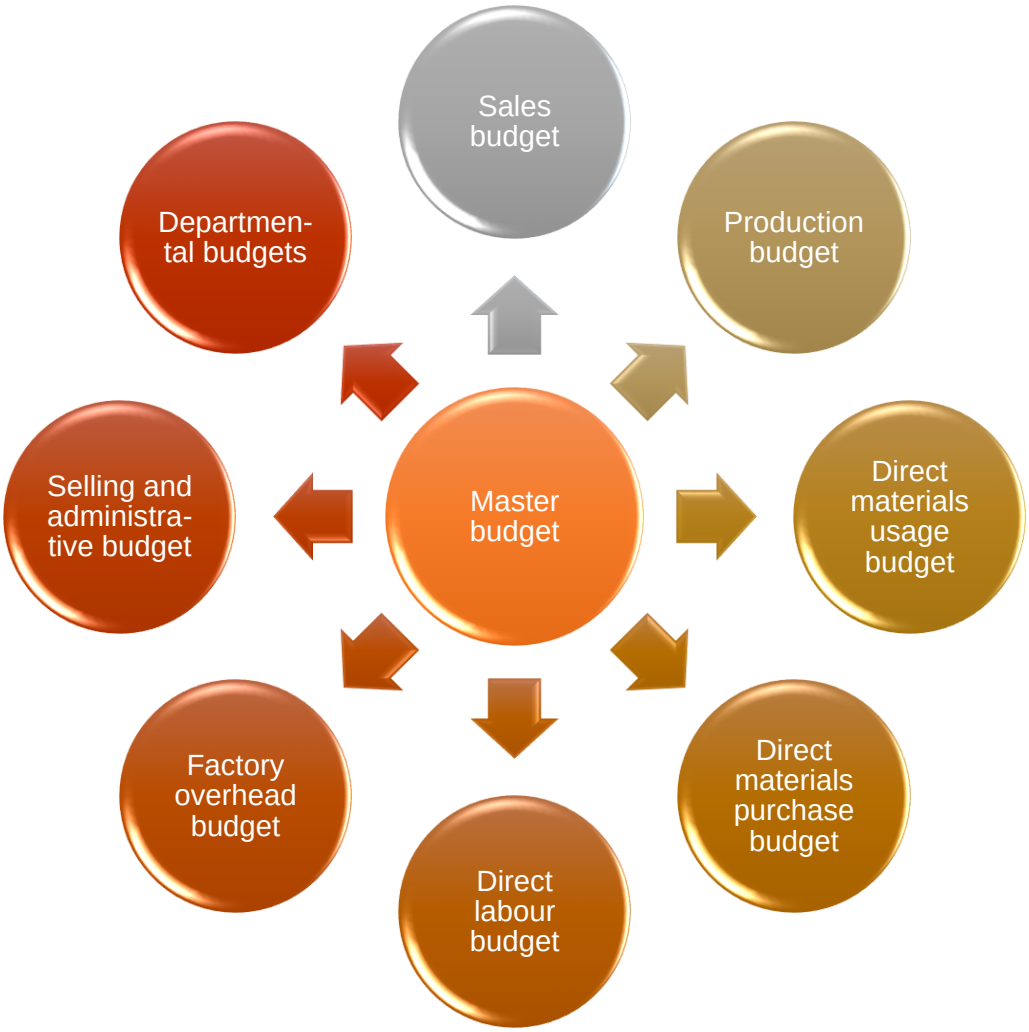

Cash budgets

The purpose of a cash budget is:

- to ensure that funds are always available to meet operational requirements, i.e. day-to-day cash needs;
- to ensure that the maximum cash is available; and
- that any excess cash over and above which is needed to meet the operational requirements is invested to earn interest thereon.

It is important to note that **only cash** receipts and payments are taken into consideration. Remember that for accounting we have non-cash items, for example depreciation, credit sales and credit purchases. These items will not form a part of your cash budget since they are non-cash items and are used for accounting purposes. If we refer to debtors, for example, then only the credit sales that were received in cash for that month or period will be included in the cash budget and **not** the credit sales as per the accounting records.

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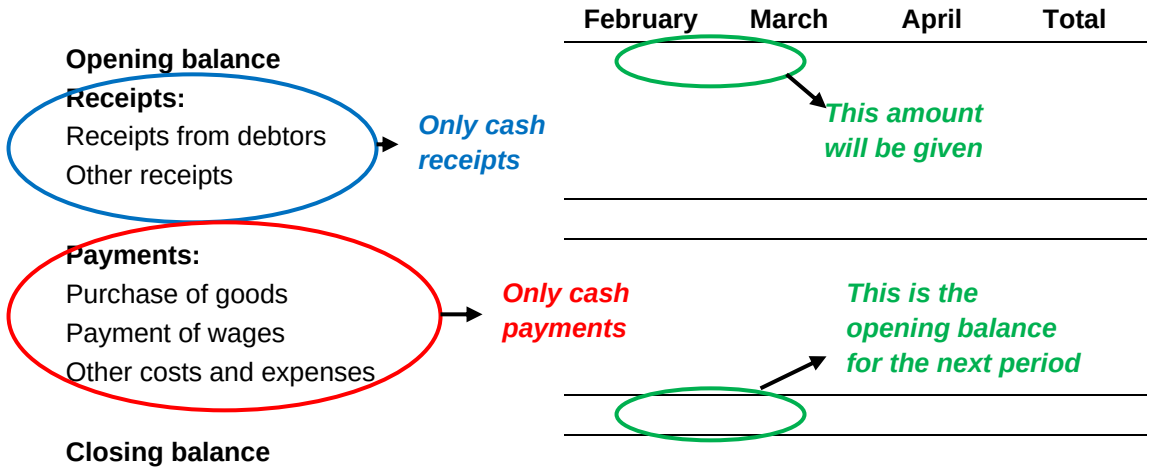
Cash budgets can be performed for different intervals, for example monthly, quarterly, etc. It is important though that it is done on a regular basis.

An example of the format of a cash budget would be as follows:



Activity 9.1

The following information was provided by Budge Corp (Pty) Ltd.

1. The bank statement reflected a credit balance of R2 340 on 28 February 20X1.

2.

	Actual sales			Budgeted sales	
	December (R)	January (R)	February (R)	March (R)	April (R)
Cash sales	7 500	6 000	7 200	7 600	6 800
Credit sales	22 000	20 000	19 500	19 000	22 000
Cash purchases	5 200	4 500	4 600	4 800	4 300
Credit purchases	11 000	10 500	9 800	8 500	10 800
Current expenses	1 180	1 280	1 320	1 300	1 200

3. Debtors pay their accounts as follows:

- 30% after 30 days
- 50% after 60 days
- 15% after 90 days
- 5% written off after 120 days

4. Creditors are paid one month after purchases.
5. Current expenses are paid in cash, two months after they have been incurred.

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6. Depreciation amounts to R 800 a month.
7. A building is rented out at R 2 000 per month. The rent is received monthly and increases annually on 1 March by 7%.

REQUIRED

Prepare the debtors collection schedule and cash budget of Budge Corp (Pty) Ltd for 31 March 20X1.

Flexible budgets

At the beginning of the year a company compiles a budget based on budgeted costs and budgeted production and sales volumes, called the **fixed budget**. This budget is compiled for control purposes to ensure the company stays within certain parameters of spending and to attain targets in terms of sales and production. Actual results for the year can, however, only be obtained at the end of the year.

During and at the end of the year we are monitoring actual income and expenses versus budgeted income and expenses and investigating any variances. When investigating these variances, managers are mainly held responsible for variances from budgeted compared to actual results. However, production and sales volumes are not necessarily as budgeted. As production volumes change, variable costs are affected and will increase and decrease as levels of production will increase and decrease. As sales volumes change the total revenue will also be affected. If we only use the fixed budget and compare this to actual results, it will be unfair to hold managers responsible for overspending since increases in costs might be due to production levels and not costs.

To overcome this problem, **flexible budgets** have been introduced. When compiling a flexible budget, it is taken into consideration that production and sales volumes are not as per budget. With a flexible budget we reconstruct the fixed budget and use the budgeted cost per unit and multiply that with actual production and sales volumes respectively. Based on the flexible budget we can now hold managers responsible and accountable for any overspending.

This concept is important to grasp for when we are going to do standard costing where we will be working with budgeted costs per unit and not budgeted costs in total.

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Illustrative example

Tebogo drafted the following condensed budget for her Pottery Clay business according to the direct costing method for April. She based her calculation on an activity level of **6 000** units.

	Per unit	Total
	R	R
Sales (6 000 units at R30 each)	30,00	180 000
Less: Variable cost	16,70	100 200
Material (12 000kg at R5,00 per kg)	10,00	60 000
Labour (600 hours at R25 per hour)	2,50	15 000
Manufacturing Overheads (600 hours at R12 per hour)	1,20	7 200
Sales commission (6 000 units at R3,00 per unit)	3,00	18 000
Contribution	**13,30**	**79 800**
Less: Fixed cost		38 500
Manufacturing		30 000
Sales and administrative		8 500
Budgeted net profit		**41 300**

The following were the actual results of Tebogo's Pottery Clay, who manufactured and sold 7 000 units.

	Total
	R
Sales (7 000 units at R32 each)	224 000
Less: Variable cost	118 800
Material (15 000kg at R4,50 per kg)	67 500
Labour (750 hours at R28 per hour)	21 000
Manufacturing Overheads	7 900
Sales commission (7 000 units at R3,20 per unit)	22 400
Contribution	**105 200**
Less: Fixed cost	40 000
Manufacturing	32 000
Sales and administrative	8 000
Actual net profit	**65 200**

REQUIRED

Draw up a comparison of actual results and the flexible budget based on the actual production of 7 000 units.

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Solution to Illustrative example

	Fixed budget	Actual (2)	Flexed budget (1)	Variance (1) - (2)	
Volume	**6000**	**7000**	**7000**		
	R	**R**	**R**	**R**	
Sales *(1) R30 x 7 000 units*	180 000	224 000	210 000	14 000	f
Less: Variable cost	100 200	118 800	100 200	18 600	f
Material *(1) (12 000kg/6 000 x 7 000) x R5*	60 000	67 500	70 000	2 500	f
Labour *(1) (600/6 000 x 7 000) x R25*	15 000	21 000	17 500	3 500	u
Manufacturing Overheads *(1) (600/6 000 x 7 000) x R12*	7 200	7 900	8 400	500	f
Sales commission *(1) (7 000 x R3)*	18 000	22 400	21 000	1 400	u
Contribution	**79 800**	**105 200**	**79 800**	**25 400**	f
Less: Fixed cost	38 500	40 000	38 500	1 500	
Manufacturing	30 000	32 000	30 000	2 000	u
Sales and administrative	8 500	8 000	8 500	500	f
Net profit	**41 300**	**65 200**	**41 300**	**23 900**	f

(f) favourable
(u) unfavourable

Revision Exercises

Revision Exercise 9.1

Fountain View (Pty) Ltd buys and sells purified water. The company management accountant prepared the following budgeted contribution statement for June 20X1:

	R
Sales	1 600 000
Less: Variable costs	970 000
Opening inventory	130 000
Purchases	900 000
Less: Closing inventory	(240 000)
Variable selling costs	30 000
Contribution	**630 000**
Less: Fixed costs	100 000
Production overheads	40 000
Administrative overheads	60 000
Net profit before tax	**530 000**

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Additional information:

- The bank opening balance on 1 June 20X1 is expected to be R 160 000.
- Cash sales will amount to 60% of total sales for June. In July 20X1, cash sales as a percentage of total sales are expected to increase to 70%.
- 70% of inventory purchased in June will be on a cash basis. All June credit purchases will only be paid in July or August.
- The company's total credit purchases in May amounted to R 280 000. 80% of May credit purchases will be settled in June and the remaining balance must be settled in July.
- Cash receipts in June in respect of credit sales of May amounted to R 220 000.
- Total depreciation amounts to R 20 000 per month and is included in the budgeted fixed costs above.
- All other expenses in the above contribution statement will be incurred on a cash basis.
- In June 20X1 the company is expected to settle a liability of R 48 000 in cash.

REQUIRED

Prepare a cash budget for June 20X1 and calculate the expected closing balance in the bank account as at June 20X1. Ignore taxation.

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Learning Unit 10: Standard costing

Learning Objectives:

- Calculate selected variances using a standard costing system
- Discuss reasons for variances
- Prepare a reconciliation between budgeted and actual profit
- Calculate the standard cost

Material used for this learning unit:

- Chapter 16 of the prescribed textbook

Prescribed material used for this learning unit:

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

Study the following subsections in chapter 16:

- Purposes of standard costing
- Material variances
  - Material price variances
  - Material usage variance
  - Total material variance
- Labour variances
  - Wage rate variance
  - Labour efficiency variance
  - Total labour variance
- Variable overhead variances
  - Variable overheads expenditure variance
  - Variable overhead efficiency variance
- Fixed overhead expenditure or spending variance
- Sales variances
  - Sales margin price variance
- Reconciliation of budgeted and actual profit

My notes

Introduction

Standard costing systems were introduced mainly for control purposes. Standard costing systems allow detailed analysis of deviations from budgeted costs. The main difference between standard costing and budgets is that with budgets we work with a budgeted cost in total whereas with standard costing we work with a standard cost per unit.

If budgeted production is 20 000 units and standard cost per unit is R10, the budgeted cost would be R 200 000. With a standard cost you would go one step further to determine what the R10 is made up of. For example, 5kg of plastic at R2 per kilogram, and this is then called a standard.

In this learning unit we will look at various variances that will in the end reconcile the budgeted profit to the actual profit. These variances include material variances, labour

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variances, variable manufacturing overhead variances, fixed manufacturing overhead variances and sales variances.

A variance will always be either favourable (f) or unfavourable (u).

Key abbreviations

It is important to know the following key abbreviations for the purposes of this learning unit:

Volume (manufactured)	V
Actual volume	AV
Budgeted volume	BV
Standard (allowed) cost	SC
Actual cost	AC
Price	P
Standard price	SP
Actual price	AP
Quantity (input)	Q
Standard ***(allowed)*** quantity	SQ
Actual quantity	AQ
Standard (hourly) rate	SR
Actual (hourly) rate	AR
Hours (labour or machine)	H
Standard ***(allowed)*** hours	SH
Actual hours	AH
Favourable	f
Unfavourable (also referred to as adverse)	u

Material variances

The cost of material included in product cost is made up of how much you paid for the materials and how much materials you used. When the variance from budgeted to actual costs is analysed it would be made up of a material price variance and a material usage variance.

Material price variance

The material price variance is the difference between what we wanted to pay for materials and what we paid for materials.

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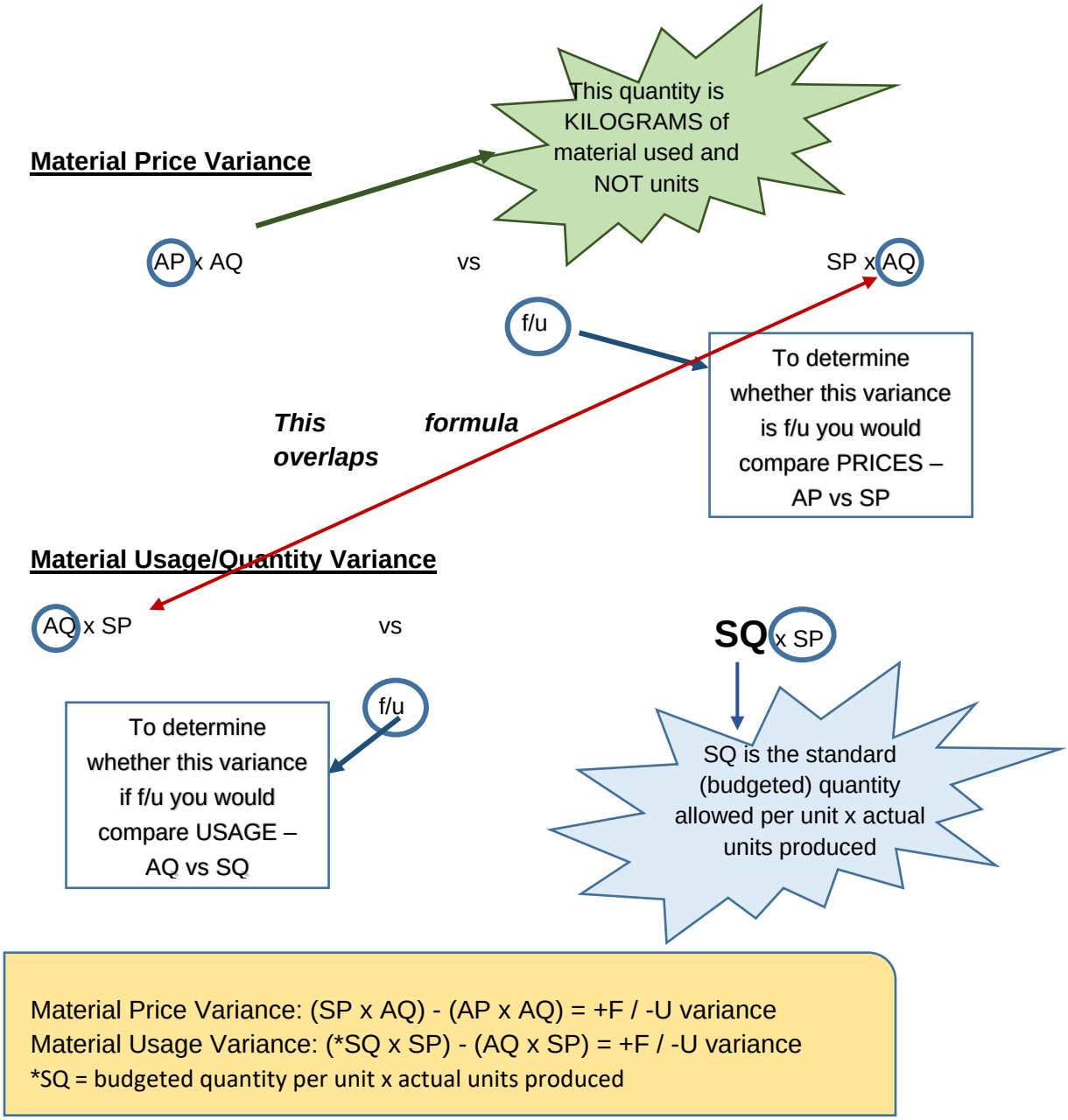
Material usage or quantity variance

The material usage or quantity variance compares the quantity (in kilograms/litres/metres, etc.) that we wanted to use per unit for the actual output in units to what we actually used for the actual output.

The following formulas can be used to calculate these variances:


Material Price Variance
This quantity is KILOGRAMS of material used and NOT units
AP x AQ
vs
SP x AQ
f/u
To determine whether this variance is f/u you would compare PRICES – AP vs SP
This formula overlaps
Material Usage/Quantity Variance
AQ x SP
vs
SQ x SP
f/u
To determine whether this variance if f/u you would compare USAGE – AQ vs SQ
SQ is the standard (budgeted) quantity allowed per unit x actual units produced

Material Price Variance: (SP x AQ) - (AP x AQ) = +F / -U variance
Material Usage Variance: (*SQ x SP) - (AQ x SP) = +F / -U variance
*SQ = budgeted quantity per unit x actual units produced

Total material variance

The total material variance can be calculated in two ways:

1) The difference between the standard material cost for actual production (SC) and actual cost (AC); or
2) By adding up the material price variance and material usage variance.

Activity

Attempt requirements a) to c) of the Illustrative example at the end of this learning unit.

Reasons for material variances

Material price variance

The purchasing department would be responsible for this variance. Some factors would be within their control, but they cannot always be held responsible since some factors are not within their control.

Factors within their control:

- Quantity rebates on bulk purchases were available and they did not take advantage thereof;
- Poor planning, which might lead to higher than budgeted prices and increased delivery costs due to increased number of orders placed.

Factors not within their control:

- Price rises due to, for example inflation, exchange rates and fuel price increases;
- Material shortages due to unforeseen circumstances, for example fire, floods, that lead to orders being processed at the last minute at higher prices.

Material usage or quantity variance

This variance can in most cases be controlled by the department and reasons can include:

- Employee carelessness
- Inferior quality of material
- Quality controls being either too strict or too poor
- Employees not being trained on the production process

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Labour variances

Total labour cost is derived from cost paid per hour and hours worked. Therefore, when analysing this variance, one would have to do an analysis in terms of both rates and hours. You would do this by calculating a labour rate variance and a labour efficiency variance.

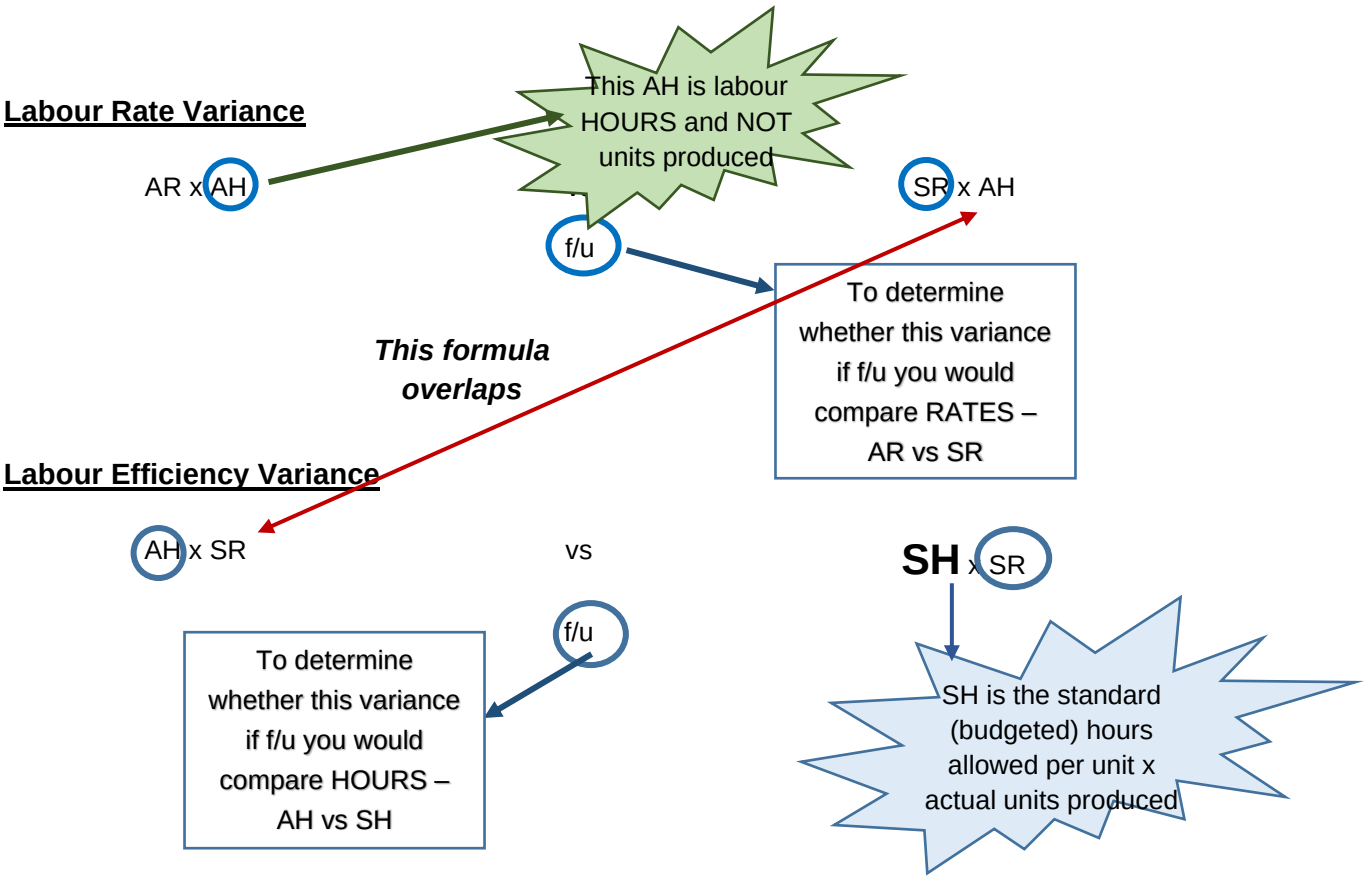
Labour rate variance

When calculating the labour rate variance, you would compare what the company wanted to pay for labour on an hourly basis (the set standard per hour) and what was actually paid during the year.

Labour efficiency variance

The labour efficiency variance indicates how efficient the employees were. To measure this, we can compare hours or minutes that were expected to be spent per unit for actual output in units with hours or minutes that were actually spent for output in units.

The following formulas can be used to calculate these variances:


Labour Rate Variance
AR x AH
This AH is labour HOURS and NOT units produced
SR x AH
f/u
To determine whether this variance if f/u you would compare RATES – AR vs SR
This formula overlaps
Labour Efficiency Variance
AH x SR
vs
SH x SR
f/u
To determine whether this variance if f/u you would compare HOURS – AH vs SH
SH is the standard (budgeted) hours allowed per unit x actual units produced

Labour Rate Variance: (SR x AH) - (AR x AH) = +F / -U variance
Labour efficiency Variance: (*SH x SR) - (AH x SR) = +F / -U variance
*SH = budgeted hours per unit x actual units produced

Activity

Attempt requirements d) to f) of the Illustrative example at the end of this learning unit.

Total labour variance

The total labour variance can be calculated in two ways:

1) The difference between the standard labour cost for actual production (SC) and actual cost (AC); or
2) By adding up the labour rate variance and labour efficiency variance.

Reasons for labour variances

Labour rate variance

The human resource department would be responsible for this variance, however there is not much control they can have over this variance. The two most common reasons for this variance would be:

- Wage rates could not be negotiated at the rate that the company wanted it to be.
- Workers were employed from different grades than was initially planned, for example, workers at a higher skilled level were used.

Labour efficiency variance

This variance can be controlled by the production manager or factory supervisor. You will see that there are similarities between the reasons for this variance and the material usage variance. Reasons would include:

- Inferior quality of material used
- Workers not skilled for the job to be performed
- Unexpected idle time
- Changes in quality standards – takes more time to ensure quality products are produced
- Employees not being trained on changes in the production process

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Variable manufacturing overhead variances

The variable manufacturing overhead variance is analysed very similarly to the labour variances. You will also use a rate variance and an efficiency variance. The reason for this is that the variable manufacturing overheads will normally vary with labour hours worked. Note that the same hours will be used as was used for labour, but the rate will now change.

Sometimes, however, variable manufacturing overheads **do not** vary with labour hours and in that case, there will be only one variance where the standard cost (standard rate for actual output) will be compared to the actual cost – note that this is also how you would calculate the variance in total.

We will now look at the variances where variable manufacturing overheads vary with labour hours:

Variable manufacturing overhead rate variance

When calculating this variance, we compare the set standard (what they wanted to pay) to what they actually paid for the actual hours that was worked.

Variable manufacturing overhead efficiency variance

The variable manufacturing overhead efficiency variance is calculated by comparing the standard hours or minutes allowed per unit for actual units produced to the actual hours worked.

The following formulas can be used to calculate these variances (Note that these formulas are the same formulas than what we used for labour, the only variable that will change, is the rate):

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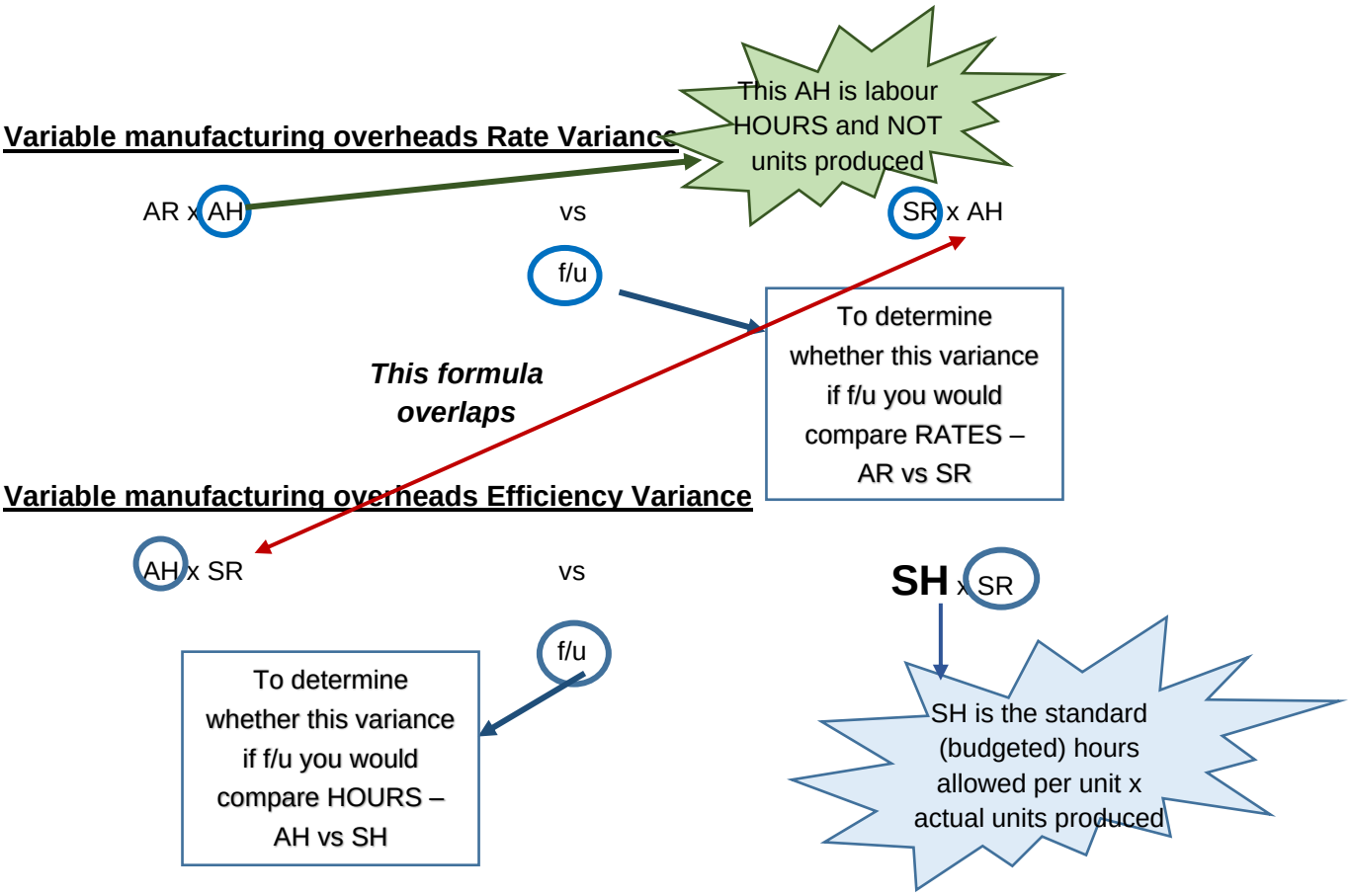
Variable manufacturing overheads Rate Variance
This AH is labour HOURS and NOT units produced
AR x AH
vs
SR x AH
f/u
To determine whether this variance if f/u you would compare RATES – AR vs SR
This formula overlaps
Variable manufacturing overheads Efficiency Variance
AH x SR
vs
SH x SR
f/u
To determine whether this variance if f/u you would compare HOURS – AH vs SH
SH is the standard (budgeted) hours allowed per unit x actual units produced

Variable overhead rate variance: (SR x AH) - (AR x AH) = +F / -U variance
Variable overhead efficiency Variance: (*SH x SR) - (AH x SR) = +F / -U variance
*SH = budgeted hours per unit x actual units produced

Total variable manufacturing overhead variance

The total variable manufacturing overheads variance can be calculated in two ways:

1) The difference between the standard variable manufacturing overhead cost for actual production (SC) and actual cost (AC); or
2) By adding up the variable manufacturing overheads rate variance and variable manufacturing overheads efficiency variance.

Activity

Attempt requirements g) to i) of the Illustrative example at the end of this learning unit.

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Reasons for variable manufacturing overhead variances

Variable manufacturing overheads rate variance

Manufacturing overheads (both fixed and variable) are made up of various line items, including water and electricity, rent, rates and taxes, etc. All of these variances are linked to inflation and would mostly not be within the control of the company. Due to the different line items contained in overheads, the investigation would be much more onerous than with the other variances.

Variable manufacturing overheads efficiency variance

Due to this variance varying with labour hours, the same reasons for the labour efficiency variance would apply.

Fixed manufacturing overhead variances

There are several fixed manufacturing overhead variances, of which the most popular ones are the expenditure variance and the volume variance. For purposes of MFAC6211 we will **only** deal with the expenditure variance.

Fixed manufacturing overhead expenditure variance

The fixed manufacturing overhead expenditure variance is the difference between the budgeted fixed manufacturing overhead costs and the actual fixed manufacturing overhead costs. If the company spent more than budgeted, the variance will be unfavourable, if the company spent less than what was budgeted, the variance will be favourable.

Budget - Actual = +F / -U variance

Activity

Attempt requirement j) of the Illustrative example at the end of this learning unit.

Sales variances

Sales variances arise due to a difference in the price that we sold the product at compared to what we budgeted and the difference in volume that we actually sold compared to what we wanted to sell. There are various sales variances. For the purposes of MFAC6211 we will only deal with the selling price variance.

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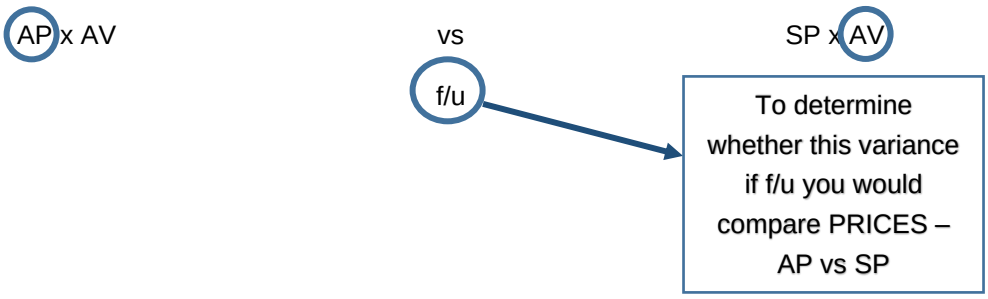
Selling price variance

To calculate the selling price variance, we compare the price at which we sold the product to the price that we wanted to sell the product for. The following formula can be used to calculate the variance:



Selling Price Variance: (AP x AQ) - (SP x AQ) = +F / -U variance

Activity

Attempt requirement k) of the Illustrative example at the end of this learning unit.

Reasons for the selling price variance

The reasons for a selling price variance could include:

- An aggressive advertising campaign
- An increase or decrease in demand of the product
- Competition in the market

Reconciling budgeted results with actual results

After you have calculated all variances, you can reconcile your budgeted results with your actual results. The following format will be used to do this (Note that you start with the budgeted profit and then add all the variances calculated to derive at the actual profit):

Budgeted profit		
Variances:		f/u
Material price variance		
Material usage variance		
Labour rate variance		
Labour efficiency variance		
Variable manufacturing overhead rate variance		
Variable manufacturing overhead efficiency variance		
Fixed manufacturing overhead expenditure variance	xxx	
Selling price variance		
Actual profit		

Indicate whether f/u

Simply list all your variances

If (f) – add, if (u) - deduct

Activity 1

Do requirement l) of the Illustrative example at the end of this learning unit.

Illustrative example

Namib Leather (Pty) Ltd purchases leather which is cut into small strips. These strips are then sewn together to make car seat covers. The company budget to sell these seat covers at R 200 per cover. The budgeted profit for December 20X1 is R 280 000. Actual profit was R 279 930,50.

The **standard** variable cost per seat cover is as follows:

Material leather (2 metres at R 28 per metre)	R 56
Direct labour (3 hours at R 18 per hour)	R 54
Variable manufacturing overheads	R 30
Total standard variable cost per unit	**R 140**

Additional information:

- Fixed manufacturing overheads are budgeted to be R 45 000 in total.
- The company budgeted to manufacture and sell 12 000 units in December 20X1.
- Variable manufacturing overheads vary with hours worked.

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Actual results for December 20X1 were as follows:

Total leather costs at R32 per metre	R 658 560,00
Total labour cost (30 285 hours)	R 529 987,50
Total variable manufacturing overheads	R 300 522,00
Total fixed manufacturing overheads	R 50 000,00
Actual units manufactured and sold for December 20X1	9 960 units
Actual selling price for December 20X1	R 210

REQUIRED

a) Calculate the material purchase price variance.
b) Calculate the material usage variance.
c) Calculate the total material variance.
d) Calculate the labour rate variance.
e) Calculate the labour efficiency variance.
f) Calculate the total labour variance.
g) Calculate the variable manufacturing overheads rate variance.
h) Calculate the variable manufacturing overheads efficiency variance.
i) Calculate the total variable manufacturing overheads variance.
j) Calculate the fixed manufacturing overheads expenditure variance.
k) Calculate the selling price variance.
l) Reconcile the budgeted profit to the actual profit for December 20X1.

Revision Exercises

Revision Exercise 10.1

Little Giants (Pty) Ltd manufactures giant teddy bears and uses a standard costing system. The following information is available:

Standard cost per bear is:		**R**
Direct material: fabric	(1.5m @ R200 per m)	300
Direct material: décor	(0.5kg @ R12 per kg)	6
Direct material: stuffing	(1kg @ R50 per kg)	50

20 hours of direct labour is required per teddy bear at a rate of R20 per hour. Variable overhead varies with labour hours worked at a rate of R5 per hour.

Variable selling costs is budgeted as R30 000 and the selling price per teddy bear is R 900.

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Actual information per bear for the financial year ended 31 December 20X1 was as follows:

Direct material: fabric	1.6 m used at a price of R180 per meter
Direct material: décor	0.4 kg used at a price of R11 per kg
Direct material: stuffing	800 grams were used and a price of R52 per kg paid
Labour hours	22 hours per bear
Labour rate	R22 per hour
Variable overhead rate variance	R20 000 favourable

Actual selling price per teddy bear was R 950.

Teddy bears manufactured and sold was 1 500.

REQUIRED

a) Calculate the material price variance for materials fabric and décor.
b) Calculate the material usage variance for material stuffing.
c) Calculate the labour rate variance.
d) Calculate the labour efficiency variance.
e) Calculate the actual variable overhead rate.
f) Calculate the selling price variance.

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Revision Exercise 10.2

Cough & Co (Pty) Ltd produces cough syrup and uses a standard costing system. They have recently accepted a contract to produce a special order of cough syrup for a potential large future customer. The following information is available:

Standard cost per bottle of cough syrup is:

		R
Direct material A	(150 ml @ R 480 per litre)	72
Direct material B	(60 ml @ R 150 per litre)	9
Direct material C	(75 ml @ R 160 per litre)	12

12 hours of direct labour is required per bottle of cough syrup at a rate of R 30 per hour. Variable overhead varies with labour hours worked at a rate of R 10 per hour.

Actual information for cough syrup for the financial year ended 31 August 20X1 was as follows:

Direct material A	3 520 litres at a total cost of R 1 619 200
Direct material B	1 210 litres at a total cost of R 193 600
Direct material C	1 760 litres at a total cost of R 290 400
Labour hours	308 000 hours in total
Labour rate variance	R 616 000 favourable
Variable overhead rate	R 8 per hour

Bottles of cough syrup produced and sold was 22 000.

REQUIRED

a) Calculate the material price variance for materials A and B.
b) Calculate the material usage variance for material C.
c) Calculate the actual labour rate.
d) Calculate the labour efficiency variance.
e) Calculate the variable overhead rate variance.
f) Calculate the variable overhead efficiency variance.

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Revision Exercise 10.3

PCD (Pty) Ltd recently started producing paint and make use of a standard costing system. The company has summarized the variances for October 20X1 as follows:

Selling price variance	R 35 200	unfavourable
Direct material purchase price	R 7 000	favourable
Direct labour rate	R 5 400	unfavourable
Direct labour efficiency	R 12 600	unfavourable
Variable manufacturing overhead expenditure	R 4 500	unfavourable
Fixed manufacturing overhead expenditure	R 5 400	favourable

Actual number of units produced and sold for the month was 22 000. Direct materials actually purchased and used were 5 000kg.

The following data was extracted from the budget for October 20X1:

Sales volume	20 000 units
Sales revenue	R 400 000
Production volume	20 000 units
Direct materials purchased and used	4 000 kg
Direct materials cost	R 60 000
Direct labour hours	14 000
Direct labour cost	R 420 000
Variable manufacturing overhead cost	R 25 000
Fixed manufacturing overhead cost	R 40 000

Variable manufacturing overhead cost varies with production.

REQUIRED:

a) Calculate the actual selling price per unit.
b) Calculate the actual purchase price per kilogram of materials.
c) Calculate the actual direct material cost.
d) Calculate the actual direct labour hours.
e) Calculate the actual direct labour cost.
f) Calculate the actual variable manufacturing overhead cost.
g) Calculate the actual fixed manufacturing overhead cost.

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Revision Exercise 10.4
Attempt Review Problem 18.23 in the Drury textbook.

Revision Exercise 10.5
Attempt Question 18.10 in the Drury Student Manual.

Revision Exercise 10.6
Attempt Question 18.6 in the Drury Student Manual.

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Learning Unit 11: Relevant costing

Learning Objectives:

- Identify the characteristics that make information relevant.
- Distinguish between relevant and irrelevant information with regards to a specific decision.
- Identify the qualitative factors that has an influence on a specific decision taken.
- Calculate relevant incremental cash flows in a given scenario.
- Identify the preconditions for a special price.
- Determine appropriate prices for special orders taking into account relevant information, including opportunity costs.
- Calculate contribution per unit of a limiting factor identified in a given scenario.
- Determine the optimal allocation of available resources.
- Determine the optimal product mix.

Material used for this learning unit:

- Chapter 11 of the prescribed textbook

Prescribed material used for this learning unit:

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

Study the following subsections in chapter 11:

- Identifying relevant costs and revenues
- Special pricing decisions
- Product mix decisions when capacity constraints exist
- Determining the relevant costs of direct materials
- Determining the relevant costs of direct labour

My notes

Introduction

Identifying relevant costs and revenues is one of the most important functions in management accounting. It is important to distinguish between relevant costs and irrelevant costs as relevant costs would be included in your decision-making and irrelevant costs will specifically be excluded. In this learning unit you will learn how to distinguish between relevant and irrelevant costs. This is then used for decision-making in the following circumstances:

1. Special selling price decisions;
2. Product mix decisions when capacity constraints exist;
3. Decisions on replacement of equipment;
4. Outsourcing (make or buy) decisions;
5. Discontinuation decisions.

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In MFAC6211 we will only focus on special selling price decisions and product mix decisions when capacity constraints exist.

Relevant versus irrelevant costs

Relevant costs always need to meet the following criteria:

- It relates to the future.
- it is cash in nature.
- It is directly attributable to the decision to be taken.
- It arises as a result of the decision to be taken and will therefore not exist if this decision will not have been an option.

You need to know the following terminology:

Term	Relevant/Irrelevant	Explanation
Sunk cost	Irrelevant	These costs have been incurred in the past and regardless of what decision you take they cannot be changed.
Committed (unavoidable) costs or income	Irrelevant	Even though this cost will result in a future cash flow, it is a result of a decision that was taken in the past and therefore regardless of the decision you take, it will be incurred/received.
Incremental costs or income	Relevant	These are additional costs or income that arise because of the decision to be taken and is therefore a future cash flow.
Avoidable costs	Relevant	These costs can be avoided because of the decision taken and therefore result in a future cash inflow.
Opportunity costs	Relevant	This is the contribution given up because of an alternative or option selected.

There are two approaches that can be used when making decisions:

1. Comprehensive approach
2. Differential (Incremental) approach

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Special pricing decisions

Special pricing decisions are made once-off. They can be made for both short-term and long-term decisions. In MFAC6211 we will focus on short-term decisions only. Special pricing decisions will be below the market price due to the company wanting it to be competitive.

Four important factors must be considered before accepting an order:

1. The future selling price should not be affected by selling the once off order at a price below the market price. Therefore, it is sometimes safer for the company to find a customer outside of its normal market.
2. There should not be better opportunities awaiting due to the special pricing decision being quoted below market price.
3. There should be spare capacity, or else opportunity cost should be taken into consideration.
4. Because this is a short-term decision it will be assumed that fixed costs are unavoidable.

Included in the costing of the special pricing decision will be direct material and direct labour costs and it is therefore important to determine the relevant costs of these.

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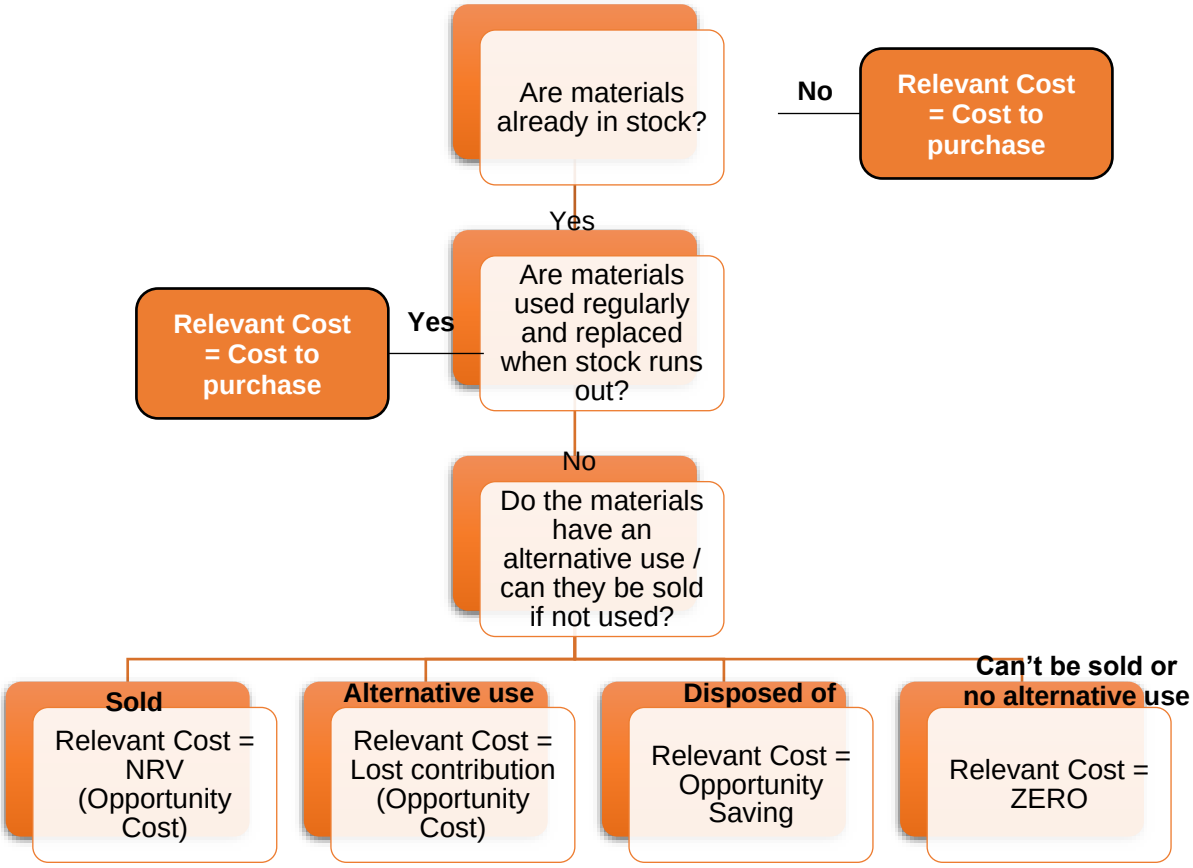
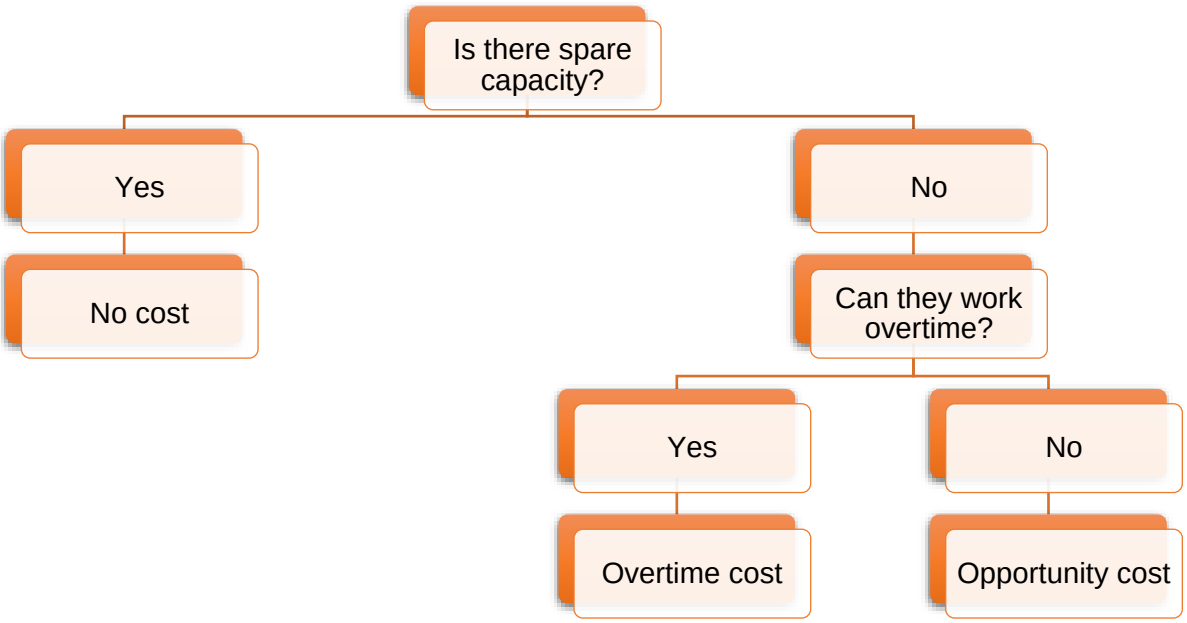
Determining the relevant costs of direct material

To determine the relevant costs of direct material to be included in your calculation you can make use of the following decision tree:


Are materials already in stock?
No
Relevant Cost = Cost to purchase
Yes
Are materials used regularly and replaced when stock runs out?
Yes
Relevant Cost = Cost to purchase
No
Do the materials have an alternative use / can they be sold if not used?
Sold
Relevant Cost = NRV (Opportunity Cost)
Alternative use
Relevant Cost = Lost contribution (Opportunity Cost)
Disposed of
Relevant Cost = Opportunity Saving
Can't be sold or no alternative use
Relevant Cost = ZERO

Determining the relevant costs of direct labour

To determine the relevant costs of direct labour to be included in your calculation you can make use of the following decision tree:



Activity 11.1

Answer question IM9.2 in the Drury textbook, 11th edition.

Product mix decisions when capacity constraints exist

Sales demand may sometimes be greater than production capacity. Production output may be restricted due to, for example, labour hours or availability of a material used in your product. These would be called scarce resources and are known as limiting factors.

Due to the limiting factor's existence, we are not able to meet sales demand, because it is not possible to produce enough units to meet the demand. The following steps can be used to determine what product mix would maximize profit considering the capacity constraint:

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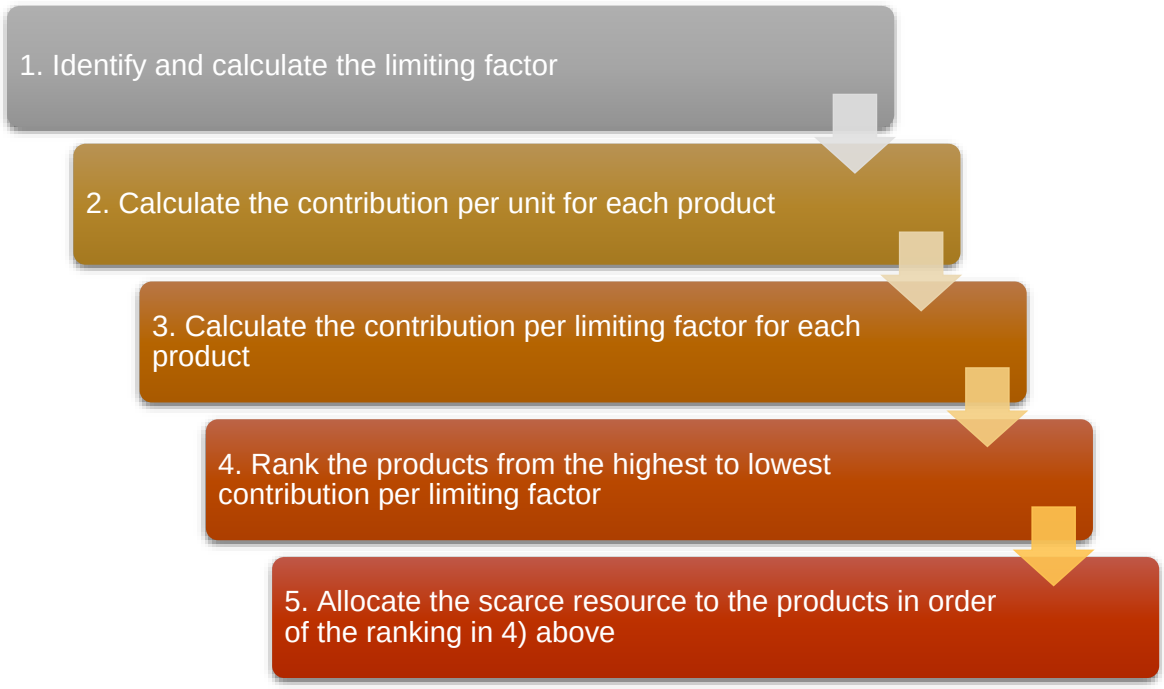
1. Identify and calculate the limiting factor
2. Calculate the contribution per unit for each product
3. Calculate the contribution per limiting factor for each product
4. Rank the products from the highest to lowest contribution per limiting factor
5. Allocate the scarce resource to the products in order of the ranking in 4) above

Activity 11.2

Answer question IM9.5 in the Drury textbook, 11th edition.

Revision Exercises

Revision Exercise 11.1

Big Foot Limited manufactures shoes and sells four different types of shoes – heels, slippers, sneakers and boots. Management is in the process of preparing the budget for 20X1 but have noted that the demand for their shoes will not be met due to a limited number of labour hours. The labour hours available are 8 500. The company will not be able to acquire additional labour, but the labour hours available can be reassigned between products as required.

The demand for each of the four products are as follows:

Heels	800 pairs
Slippers	1 200 pairs
Sneakers	2 000 pairs
Boots	800 pairs

It takes 2 hours to manufacture one pair of heels and 1.5 hours for one pair of slippers. It takes them 1 hour to manufacture one sneaker and twice as long to manufacture a boot.

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Additional information:

- Heels are expected to sell for R200, slippers for R120, sneakers for R250 and boots for R580.
- Variable costs per unit are budgeted as follows:

Cost	Heels	Slippers	Sneakers	Boots
Direct Labour	R 40	R 20	R 40	R 80
Direct Material	R 70	R 30	R 100	R 300
Overhead	R 10	R 5	R 15	R 30
Selling costs	R 5	R 2	R 5	R 10

- Fixed costs for the period are expected to be R320 000.

REQUIRED

a) Determine the maximum contribution that Big Foot Limited can generate with the labour hours available to them.

Revision Exercise 11.2

Anglo (Pty) Ltd manufactures and sells two different products, Gold and Silver. The management accountant has started preparing the budget for the 20X1 financial year and identified the following as the only limiting factor in the production process:

	Gold	Silver	Total
Labour hours required to meet full demand	2000	3 000	5 000
Total hours available			4 500

The company will not be able to acquire any additional labour, but the labour hours available can be reassigned to products as required.

Additional information:

- Budgeted fixed cost for the year are R 590 000
- Gold are expected to sell for R50 per unit and Silver for R30 per unit
- Expected regular demand for 20X1 is 3 000 Golds and 5 000 Silvers
- Variable costs per unit are budgeted as follows:

	Gold	Silver
Variable manufacturing cost	R 12	R 10
Variable selling cost	R 4	R 2
Total variable cost	R 16	R 12

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REQUIRED:

a) Determine the sales mix that should be budgeted for the coming financial year to maximize the budgeted profit for the company.

Revision Exercise 11.3

Quality Cart (Pty) Ltd manufactures quality carton boxes. The company received an order from Export Limited to design and manufacture 10 000 carton boxes. The boxes will be completed over a period of 3 months and be ready at the end of April 20X1. Each box requires 3 metres of paperboard and a customized label. The paperboard will need a coating of wax, which will be 250 ml per box.

This is a box that will be manufactured according to customer specifications and therefore will have to be designed. The current designers employed by the company will not have the capacity to design these boxes and Quality Cart (Pty) Ltd will therefore have to outsource this function to a designer at a total cost of R 3 000.

The paperboard will be purchased from a local supplier at R 3 per metre. They currently pay R 10 per one litre of wax. The wax will be applied by one of their current employees who earns a salary of R 4 500 per month.

Quality Cart currently has 8 000 labels in stock which has been purchased at R 1,50 each. These labels were used on a product line which has been discontinued 5 months ago and there is no future use for it. The labels will have to be disposed of at a total cost of R 2 500. The current purchase price of these labels is R 1,80.

The boxes are folded by a machine that has been purchased two years ago at a cost of R 8 000. The estimated useful life of this machine is 4 years and depreciation written off on the straight-line method.

To meet the deadline, 2 additional casual workers will have to be employed on a contract basis at R 3 500 each per month. These employees will be supervised, in addition to his normal responsibilities, by the factory supervisor, who earns a salary of R 12 000 per month.

The company pays factory rent of R 25 000 per month as per the lease agreement.

REQUIRED

Determine the minimum price that Quality Cart (Pty) Ltd should charge for the order of 10 000 carton boxes. Clearly indicate all costs that should be consider for the special order and indicate, with reasons, why they are included or excluded.

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Revision Exercise 11.4
Attempt Question 11.5 in the Drury Student Manual.

Revision Exercise 11.5
Attempt Question 11.6 in the Drury Student Manual.

Revision Exercise 11.6
Attempt Question 11.7 (a) in the Drury Student Manual.

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Learning Unit 12: Cost-Volume-Profit (CVP) analysis (Sensitivity analysis)

Learning Objectives:	**My notes**
• Use Cost-Volume-Profit analysis to determine the expected effect of decisions and events on profit. • Use Cost-Volume-Profit analysis to determine the expected effect of decisions and events on variables that affect profit. • Determine the sensitivity of profit to changes in selling prices. • Determine the sensitivity of profit to changes in sales volumes. • Determine the sensitivity of profit to changes in costs.	
Material used for this learning unit: • Chapter 10 of the prescribed textbook	
Prescribed material used for this learning unit: Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM) **Study the following subsections in chapter 10:** • A numerical approach to cost-volume-profit analysis • The contribution margin ratio • Relevant range • Margin of safety • Constructing a break-even chart	

Introduction

This learning unit consists of two topics. Cost volume profit analysis and sensitivity analysis. Cost volume profit analysis is used as a management tool to make business decisions. We will learn formulas and principles including the breakeven point and the margin of safety. Sensitivity analysis will then look at the sensitivity of profits to changes in variables such as selling prices, growth rates, variable costs and fixed costs.

Cost-Volume-Profit analysis

Breakeven point

The breakeven point is the point where your total revenue equals your total costs, therefore a zero profit. This can be expressed in units or in Rand value.

To calculate the breakeven point in **units** the following formula may be used:

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$$Breakeven\ point\ (units) = \frac{Fixed\ costs}{Contribution\ per\ unit}$$

It is important that if the breakeven point(units) is a decimal when calculating breakeven we should round up. If you round down, you will be making a small loss.

Contribution per unit can be calculated by deducting all variable costs from your selling price, therefore *Contribution = Selling price – all variable costs per unit*.

To calculate the breakeven point in **Rand value** the following formula may be used:

$$Breakeven\ point\ (value) = \frac{Fixed\ costs}{Contribution\ margin}$$

Contribution margin can be calculated by dividing contribution per unit by the selling price, or contribution in total by sales in total.

Alternatively, the breakeven point in Rand value can be calculated by multiplying the number of breakeven units with the selling price per unit.

Target profit

In most cases companies would like to achieve a target profit. If this is the case, they need to be able to plan what the number of units is that would have to be sold to reach the target profit. This could be done by using the following formula:

$$Target\ profit\ = \frac{Fixed\ costs + Target\ profit}{Contribution\ per\ unit}$$

The answer to the above calculation would tell you the number of units that needs to be sold to achieve the target profit. You will note that the formula used is very similar to the breakeven formula. Target profit is now just added to fixed costs.

Margin of safety

This is the amount or percentage that a company's sales can decrease before it will incur losses. It may be seen as the company's safety net. It can be calculated in both units and Rand value. To calculate this, you would use the following formulas:

$$Margin\ of\ safety\ (units)\ =\ Total\ sales\ (units) - breakeven\ sales(units)$$

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$$Margin\ of\ safety\ (value) = Total\ sales\ (value) - breakeven\ sales\ (value)$$

Margin of safety can also be expressed as a percentage of sales and is then called margin of safety ratio. To calculate this, you would use the following formula:

$$Margin\ of\ safety\ ratio\ = \frac{Total\ sales\ (units) - breakeven\ sales\ (units)}{Total\ sales\ (units)}\ x\ 100\%$$

OR

$$Margin\ of\ safety\ ratio\ = \frac{Total\ sales\ (value) - breakeven\ sales\ (value)}{Total\ sales\ (value)}\ x\ 100\%$$

Activity 12.1

The following information relates to product A:

Units produced and sold:	10 000
	R
Sales	200 000
Variable costs	120 000
Fixed costs	30 000

The company would like to achieve a profit of R 20 000.

REQUIRED

Calculate the following:

a) Contribution in total and per unit
b) Contribution ratio
c) Breakeven units
d) Breakeven value
e) Target operating income/profit units to be sold to reach the profit of R 20 000
f) Margin of safety in units
g) Margin of safety ratio

Sensitivity analysis

This topic examines the sensitivity of profits to changes in variables such as selling prices, growth rates, variable costs and fixed costs. An important assumption made in this learning unit is that there will be no uncertainty regarding the outcome.

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You will use the formulas and underlying principles covered earlier under Cost-Volume-Profit analysis to determine, for example, the effect of changes in variables on profit, breakeven, margin of safety and target profit. The basic format of the direct costing statement will be used in your analysis:

Sales *(made up of a selling price and number of units)*	xxx
Less: Variable Cost *(made up of a cost and number of units)*	(xx)
Contribution	xxx
Less: Fixed Cost	(xx)
Net profit	xxx

Remember that to determine sensitivity you always need to compare the one outcome with another. You will therefore need two sets of data in your answer. The sensitivity to change will be calculated with the same formula that you use to calculate percentage change:

$$Percentage\ change = \frac{Latest\ figure - Old/Previous\ figure}{Old/Previous\ figure}$$

Effect of changes in selling prices

If it is assumed that all other factors remain constant, but there is a change in the selling price, the following will be affected:

- Revenue
- Contribution
- Profit

Activity 12.2

Sensitive (Pty) Ltd produces one type of shampoo for sensitive hair. The following information is available for the month ended April 20X1:

Variable costs	R 60 000
Fixed costs	R 30 000
Profit	R 60 000

There was no opening or closing inventory.

REQUIRED

a) If Sensitive (Pty) Ltd wants to increase its profit for the month by 15%, by what percentage does the selling price per bottle of shampoo have to increase?

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b) If the selling price per bottle of shampoo increase by 10%, what will the effect be on:
   i. Profit (relative terms)
   ii. The break-even point in units if 5 000 bottles of shampoo were sold for the month.
   iii. Margin of safety if 5 000 bottles of shampoo were sold for the month.

You can assume that no other variables changed.

Effect of changes in sales volume on profits

If it is assumed that all other factors remain constant, but there is a change in the sales volume, the following will be affected:

- Revenue
- Variable costs
- Contribution
- Profit

Activity 12.3

The information from Activity 12.2 will now be used again. However, the selling price cannot be changed and consequently there will have to be an increase or decrease in sales volume to arrive at the desired 15% increase in profit.

REQUIRED

a) Determine the percentage increase or decrease in sales volume (number of bottles of shampoo sold) to arrive at the 15% increase in profit.
b) Assuming 5 000 bottles of shampoo were sold, determine the percentage by which the sales volume can change before the profit will drop below R 50 000.

Effect of changes in variable costs on profits

If it is assumed that all other factors remain constant, but there is a change in the variable cost per unit, the following will be affected:

- Variable costs
- Contribution per unit
- Contribution ratio
- Profit

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Activity 12.4

The information from Activity 12.2 is still applicable, but profit can now only be increased by decreasing variable cost per unit.

REQUIRED

a) Sensitive (Pty) Ltd still wants to increase their profit by 15% but can now only change the variable cost per unit. Determine the percentage change necessary to arrive at the desired profit.

Effect of changes in fixed costs on profits

If it is assumed that all other factors remain constant, but there is a change in the fixed cost in total, the following will be affected:

- Profit

Activity 12.5

The following information is available for Sensitive (Pty) Ltd for the month of June 20X1:

Margin of safety	250 units
Breakeven quantity	500 units
Contribution	R 110 000

Fixed costs include rent of a factory building which was R 20 000 for June 20X1, however will increase with 10% as from July 20X1 as per the rental agreement.

All other costs and selling prices will remain the same as in April 20X1.

REQUIRED

Calculate the effect that the increase in fixed costs in July 20X1 will have on:

a) Profit (in relative terms)
b) Break-even quantity (absolute and relative terms)
c) Margin of safety (absolute and relative terms)

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Revision Exercise 12.1

Tiger SA (Pty) Ltd is a transport company that outsource their services to other companies that are not able to afford trucks to transport their goods. They are currently in the budgeting process for the year ended 31 March 20X1 and asked your assistance with the cost-volume-profit analysis. The following budgeted information is available:

- The charge per kilometre of goods transported, regardless of the size of the load, is R6.50
- From experience, Tiger SA (Pty) Ltd has learned that if they drive 550 000 kilometres per annum their total cost is R 4 960 000 and if they drive 780 000 kilometres their total cost is R 5 696 000.
- Due to tough economic times Truck SA (Pty) Ltd budgeted to drive only 1 100 000 kilometres during the 2017 financial year. They would like to achieve a margin of safety of 150 000 kilometres.
- The company requires a target profit of R1 500 000 per annum to satisfy the owners of the company.

REQUIRED

a) Calculate the breakeven point in kilometres that Tiger SA (Pty) Ltd must drive to break even for the financial year ended 31 March 20X1.
b) Calculate the breakeven value for Tiger SA (Pty) Ltd.
c) Calculate the company's current margin of safety and indicate the percentage increase or decrease needed to achieve their target of 150 000 kilometres.
d) Will the company reach their target profit as per the current budgeted information provided to you?

[Round off to two decimal places. Round off to the nearest kilometre where applicable.]

Revision Exercise 12.2

Player Golf Carts (Pty) Ltd, a subsidiary of The Gary (Pty) Ltd, manufactures and supplies golf carts. The company has been awarded a contract by Waterfall Country Club to supply golf carts for the whole of the 20X1 financial year.

The company provided the following information for the 20X0 financial year regarding its Fantabulous Golf Cart Range:

Total production cost if 2 000 units are produced in the year R15 000 000
Total production cost if 3 500 units are produced in the year R24 000 000

The company manufactured and sold 450 golf carts in 20X1. The selling price per golf cart is R12 000. The production cost structure (variable production cost per unit and fixed production cost in total) of 20X1 is the same as in 20X0. This cost structure will remain the same for any production quantity between 1 and 10 000 units. Ignore non-manufacturing costs.

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REQUIRED

a) Calculate the breakeven point in units (golf carts) for the Fantabulous Range for 20X1.
b) Calculate the profit or loss for 20X1 based on the sales of 450 golf carts. Clearly indicate whether your answer is a profit or a loss.
c) Calculate the number of golf carts the company should sell in 20X1 to make a profit of R8 000 000.

Revision Exercise 12.3

Magnificent Fans (Pty) Ltd manufactures and sells domestic fans. The selling price per fan for 20X0 was R760. Due to the economic downturn the selling price is expected to decrease with 5% in 20X1 since the company would like to try and maintain good sales quantities.
The accountant presented you with the following cost information. The company's financial year end is 30 June:
Actual information for 20X0:

Manufacturing costs:	
Direct material cost per unit	R160
Direct labour cost per unit	R42
Variable manufacturing overhead cost per unit	R22
Fixed manufacturing overhead costs in total	R250 800
Non-manufacturing costs:	
Variable selling and distribution costs per unit	5% of the selling price
Fixed selling and distribution costs	R55 600
Fixed administrative overheads in total	R68 000

Additional information relating to 20X1:

- Direct material cost per unit is expected to increase with 12%.
- The direct labour rate per hour will increase with 3%. The company has done an analysis on the time taken per unit and expects the employee morale to be affected due to the low increase. They estimate that it will take 5% longer to manufacture a fan.
- Variable manufacturing overhead costs are expected to increase in line with the time taken per unit manufactured.
- The fixed manufacturing costs for 20X0 includes depreciation of R5 000 per month of a machine that has been fully depreciated at the end of 20X0. The company is not planning to replace the machine in 20X1. Other fixed manufacturing overheads will increase with 5%.
- Fixed selling and distribution costs is expected to increase with 5%. Variable selling and distribution costs will increase to 7% of the selling price to ensure sales personnel maximize sales.

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- Fixed administrative overheads will remain unchanged.

REQUIRED
Calculate the budgeted breakeven units for the year ended 30 June 20X1.
Round off to two decimal places.

Revision Exercise 12.4

Cute Cars (Pty) Ltd manufactures and sells toy cars. The selling price per car for 20X0 was R50 and is expected to increase with 10% per year from 20X1.

Actual information for 20X0:

Manufacturing costs:	
Direct material cost per unit	R10.00
Direct labour cost per unit	R3.00
Variable manufacturing overhead cost per unit	R2.50
Fixed manufacturing overhead costs in total	R80 000
Non-manufacturing costs:	
Selling and distribution costs in total	R19 750
Fixed administrative overheads in total	R5 000

Additional information relating to 20X1:

- Direct material cost per unit is expected to increase with 10%.
- The current labour force is on strike and demands an increase of 11%. The accountant expects the increase to remain at the planned 7%.
- Variable manufacturing overhead costs are expected to remain unchanged.
- The fixed manufacturing costs for 20X0 includes monthly factory rental of R3 000 which is due for annual escalation of 6% on 1 May each year. The balance of fixed manufacturing costs will not increase.
- Selling and distribution costs include both fixed and variable costs. Total selling and distribution costs for 20X1 are budgeted to be R20 500. Selling and distribution costs for 20X1 will be in line with 20X0.
- Fixed administrative overheads are expected to increase by 6%.
- Actual units sold during 20X0 were 23 500. The budgeted sales units for 20X1 was increased with 1 500 units from prior year.

REQUIRED
e) Calculate the budgeted breakeven units for the year ended 30 June 20X1.
Round off to two decimal places.

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References

Drury, C., Tayles, M., Benade, F., Bishop, W. and Botha, L. 2022. Management and Cost Accounting in South Africa. 1st ed. Southern Western Cengage Learning. (PM)

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